CW SAMPLE COPY
MI48106UIVYMUIVYM FCWB FC
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

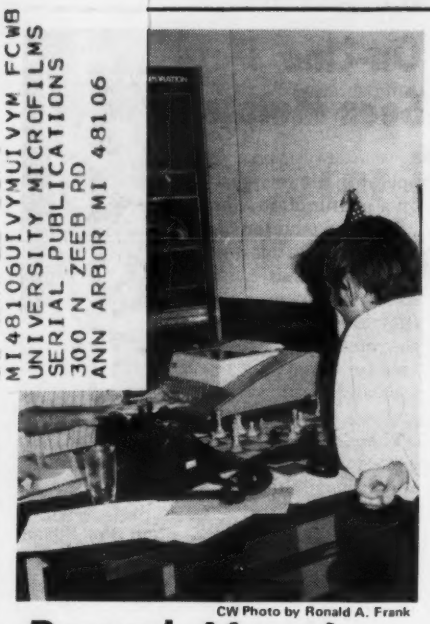
NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices © 1974 by Computerworld, Inc.

ar August 21, 1974 Vol. VIII, No. 34



CW Photo by Ronald A. Frank

Board Meeting

Dr. Monroe Newborn of U.S. chess team awaits next move from Russian team leader Mickhail Donskoy being phoned in directly from Moscow. Eight countries participated in first World Chess Championship held at Ifip '74. For results, see story on Page 7 and other Ifip coverage on Pages 4, 6, 7, 8 and 9.

Remote Maintenance: Trend of Future?

On-Line Data Bases Seen Support Key

By Ronald A. Frank
Of the CW Staff

STOCKHOLM – Future hardware systems will use display terminals to perform on-site maintenance functions, with data called up on-line from a central data base dedicated to fixing system malfunctions, according to M.J. Marcus from IBM in Poughkeepsie, N.Y.

While present systems are maintained by "computer professionals communicating over teleprocessing links," future systems will perform this function through a dialog between a user/operator, a systems support data base and/or some centrally located systems specialist, Marcus predicted at an Ifip session on future hardware trends.

"Substantial portions of the maintenance job, particularly in peripheral portions of the system, can be done by an interested user. This may be response to the display of information prompted by system self-monitoring or by display of information prompted by the request of the user himself," he continued.

"Some limited switching, adjusting, removal and replacement actions can be safely and effectively performed by the user . . . provided the hardware and software are originally designed to facilitate such maintenance measures," Marcus said.

'Comfort of Manual'

The use of reference material in the form of maintenance manuals or hard-copy printouts will decrease, Marcus predicted, although it may take years for maintenance professionals to give up "the familiar comfort of a manual."

The gradual phasing out of many reference library publications will give way to the "clearly more convenient use of the system and its terminals."

During the transition years, which Marcus described as taking place through the next decade, maintenance experts will begin to make greater use of "accumulative maintenance data bases and higher level flow diagrams."

A key point of the future systems will have to be the inclusion of self-diagnostics that will handle almost all failures at the field level, Marcus explained.

LSI technology will result in easily handled field replaceable units (FRU) and this in turn will "reduce the diagnostic resolution required to isolate field malfunctions." In addition, software will be "logically modularized" in a way that simplifies error isolation, Marcus said.

Design Features

In order to achieve these goals, hardware assemblies will be designed with built-in malfunction indicators, software will have "self-tracing" features, micro-diagnostics will enable the future systems to reach the FRU stage in hardware and the module level in software, and a system facility with a "systems information data base" will reside either in a "remote support system" or as part of the customer's data base.

This combination will provide interactive troubleshooting support to a user/

(Continued on Page 2)

'Glimpse' of FS Shows Users May Be Trapped

By Ronald A. Frank
Of the CW Staff

STOCKHOLM – IBM apparently plans to utilize "free" user labor to do most of the maintenance work on its future systems (FS), while removing vulnerable maintenance documentation from the user's site and into relatively secure data bases under its control.

These are the implications that can be drawn from a paper presented at the Ifip congress by M.J. Marcus from IBM.

Although described as strictly personal opinions, the maintenance methodology

Analysis

put forth by the the IBM staff member may provide the best view yet available of how the company plans to totally "lock in" tomorrow's FS user to IBM technology. And the approach described in the paper seems even more accurate when studied in the context of other recent IBM moves.

Dispatching high-priced systems engineers to fix malfunctioning systems is a high overhead item for IBM. Even though it has steadily increased maintenance prices over the past years, the firm still has a large investment in the training and deployment of maintenance specialists that can reach a customer site in a relatively short time.

By encouraging greater user involvement in the maintenance operation, it will be easy to make the customer feel he is getting more intimate architectural information about his system than ever before. But nothing could be further from the truth.

Actual user involvement will include "idiot-proof" rote instructions that give the user very little detailed information. And at the same time, IBM will have the customer doing work for free that formerly had to be done by IBM personnel.

Satellite's Role

The successful implementation of this new maintenance philosophy will depend to a great extent on highly reliable, continuously available teleprocessing links. And IBM's recent announcement that it intends to acquire a satellite capability appears to have a direct relationship to the FS plans. If maintenance problems are to be corrected through the use of on-line data bases, these data bases will have to be available whenever and wherever required.

(Continued on Page 2)

Ky. Consolidation Move Saves $2.4 Million Yearly

By Patrick Ward
Of the CW Staff

FRANKFORT, Ky. – The State of Kentucky has saved $2.4 million annually since it began consolidating its DP operations in April 1973, according to Charles Pryor Jr., commissioner of the Executive Department of Finance and Administration.

Starting in July 1973, the newly created Bureau of Computer Services took over an IBM 370/155 in the Justice Department, a 370/155 in the Department of Finance, a 370/165 in the Department of Transportation and a 360/50 in the Department of Health, as well as a Honeywell 2050 in the Department of Education and two IBM 360/20s in the Treasurer's Office.

Now 95% of the work formerly done on those computers is handled on the Department of Transportation's 370/165, according to Robert C. McReynolds, director of the Bureau of Computer Services.

The Honeywell 2050 is also in the bureau and the Treasurer's Department still has one of the 360/20s, McReynolds said.

The bureau sold the two 155s to Itel for $440,000, set up the 360/50 at a state college and returned other CPUs and peripherals to their manufacturers, he explained.

The consolidation has meant monthly hardware cost savings of at least $100,000 plus another $100,000 formerly spent on programming and maintaining the CPUs.

When Gov. Wendell H. Ford first announced the consolidation plan, most state officials felt "they can't do it so we don't have to worry about it," McReynolds recalled. "The vendors came in and said we couldn't do it either," he added.

But strong support from Pryor and Ford gave the bureau "the hammer to do what had to be done" to overcome these obstacles, McReynolds said.

Separating users from their own computers wasn't simple, he remarked. Many of the agencies would not conform to the centralization plan until he literally pulled the plug on their machines, McReynolds said.

But once that point came, he added, the agencies did cooperate to make consolidation work.

(Continued on Page 2)

IBM Users Allowed Extra Time To Accumulate Purchase Credits

By Vic Farmer
Of the CW Staff

ARMONK, N.Y. – IBM users can now accumulate more credits toward the purchase of rented equipment with the extension of the Purchase Option Plan.

In effect as of Aug. 1, the extension is available to users renting under the Monthly Availability Charge (MAC), Extended Term Plan (ETP) and Fixed Term Plan (FTP).

An IBM spokesman said the new pricing policy is an attempt to give lease customers "more time to decide whether the customer should purchase equipment currently on lease." Independent sources see the move as a "sharpening up of the competitive edge and an added incentive to convert to purchase after a longer lease period."

The biggest extension of options is for users under MAC. These users can accumulate up to 36 months of purchase option credits instead of the previous 12-month limit.

A user who has rented equipment for over 12 months as of Aug. 1, however, will only be credited with 12 months, although he can accumulate more rental credits on that equipment up to the 36-month limit starting Aug. 1.

Users with ETP and FTP leases can now accrue 36 months of credits. Previously these lease customers were limited to 24 months of credits.

The effect of these changes can be considerable. For example, a 370/158 user under MAC can now accumulate $829,800 after 36 months toward the purchase price of $1,998,800, instead of the previous 12-month maximum credit of $276,600.

Under all plans the accrued amount may not exceed 50% of the purchase price at the time of purchase.

The 48-month credit period for users renting under the Term Lease Plan remains unchanged.

On the Inside This Week

SP, Datran Agree to Share Data Transmission Routes —*Page 3*

Western Union Files With FCC To Curb IBM Satellite Move —*Page 37*

Communications 19
Computer Industry 37
Editorial 10
Financial 54
Societies 32
Software/Services 13
Systems/Peripherals 27

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

EDITORIAL
Editor — E. Drake Lundell Jr.
Associate Editor/ Technical News — Ronald A. Frank
Hardware Editor — Victor J. Farmer
Software Editor — Donald Leavitt
Assistant Editor/ Computer Industry — Molly Upton
Staff Writers — Nancy French, Edith Holmes, Patrick G. Ward, Toni Wiseman
Chief Copy Editor — Judith Kramer
Copy Editors — Jesse R. Victor, Cheryl M. Gelb
Photography Editor — Leslie Flanagan
Bureaus:
West Coast — Marvin Smalheiser
Europe — J.H. Bonnett
Asia — Hidetsuna Sasaki
Contributors:
Education — J. Daniel Couger
Taylor Reports/Professional Practices — Alan Taylor
Vice-President/ Editorial Services — Edward J. Bride

SALES
Vice-President/ Marketing — T. Neal Wilder
Sales Administrator — Dorothy Travis
Traffic Manager — Judy Milford
Classified Advertising — Sara Steets
Market Research — Kathryn V. Dinneen

CIRCULATION
Vice-President/ Circulation — Margaret Phelan
Assistant Manager — Barbara Jeannetti

PRODUCTION
Manager — Leete Doty
Supervisor — Henry Fling

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: Los Angeles: 963 N. Edgecliffe Drive, Los Angeles, Calif. 90026. Phone: (213) 665-6008. **Europe:** Computerworld, c/o IDC Europa, Ltd., 140-146 Camden Street, London NW1 9PF, England. Phone: (01) 485-2248/9. **Asia:** Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160.
©1974 by Computerworld, Inc.
50 cents a copy; $12 a year in the U.S.; $13 a year in Canada; all other foreign, $36 a year. Four weeks notice required for change of address.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Walter Boyd.

Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

COMPUTERWORLD, INC.
President/Publisher — Patrick J. McGovern
Executive Vice-President — W. Walter Boyd
Vice-Presidents — Edward J. Bride, Margaret Phelan, T. Neal Wilder
Editorial Director — Dr. H.R.J. Grosch

ABC ABP AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Massachusetts 02160.

Paper 'Hints' FS May Trap Users

(Continued from Page 1)

The forerunner of this total on-line approach may be the presently used Retain/370 type of maintenance which includes two IBM maintenance specialists, one at the customer site and one at a teleprocessing diagnostic center, usually in Raleigh, N.C.

This service utilizes dial-up facilities to exchange information on maintenance, and it may be that IBM has found this type of arrangement too unreliable and/or time-consuming. And dedicating two specialists to the task is obviously expensive.

So a viable alternative would be instant satellite communications from the customer site where problems occur to one and/or several widely distributed data bases each storing only a portion of the total system architecture of the customer's machine and its peripheral equipment.

There has been some question why AT&T has not openly objected to IBM providing satellite services. But if AT&T has been told that at least a major part of these proposed facilities will be offered only as support to IBM maintenance operations, Bell may not feel threatened.

There still remains the question of how the customer will connect to the satellite when malfunctions occur on his computer system, But perhaps IBM will find it cost-effective to provide at least each major system site with a small, easily erected earth station at the time of installation.

Regardless of how the on-line data bases for maintenance are accessed, less availability of maintenance and architectural specifications will limit the options available to the user.

First, it will make it increasingly difficult to attach non-IBM equipment to a CPU. A cornerstone of the plug-compatible devices has always been that the configuration could be returned to its all-IBM state for maintenance. In addition, many independent vendors relied on IBM maintenance or IBM-like maintenance procedures to troubleshoot their own units.

Presumably this kind of necessary information will now be much harder to obtain if it is distributed among a group of different data bases. Consequently, if a user has less knowledge about his system, he is more at the mercy of the vendor for any equipment information and his opportunities to innovate with other devices is restricted.

For IBM there appear to be many pluses and few minuses to this strategy. One of the potential flaws might be the possibility that valuable maintenance data could be somehow compromised during transmission to the customer site. But the existence of dispersed data bases implies that only segments of maintenance data will be transmitted at one time.

And IBM itself has devoted considerable study to the security of data. Some of the lessons it has learned must apply to satellite transmissions.

Finally, the introduction of synchronous data link control (SDLC) may be related to the introduction of on-line maintenance data bases in some way. It is known the SDLC is well-suited for satellite transmissions.

The exact plans for FS are woven into a complex web by the IBM marketing forces. But it would be wrong to assume that the paper delivered by Marcus has absolutely no relationship to IBM's strategy for its FS series.

On-Line Data Bases Seen Maintenance Key

(Continued from Page 1)

operator or a systems specialist working on a malfunction, Marcus said.

Systems maintenance professionals will have available on a day-to-day basis both local and remote data bases for maintenance problems regardless of whether they are working at a regional center or at the customer site. And this will include "ready access" by teleprocessing links to specialists on various portions of the system.

These specialists will have the ability to provide remote support to user/operators sometimes through "direct dialog," if necessary.

Only "on occasion," when the "usual approaches to a fix fail," will maintenance specialists be flown directly to an installation, Marcus predicted.

During his presentation, the IBM expert made it clear that he was giving his own opinions and not necessarily those of his company.

Phone Lines Overworked

Success Almost Ruins Park Reservation System

By Edith Holmes
Of the CW Staff

CEDAR RAPIDS, Iowa – Customer enthusiasm for a park reservation plan here, a telephone-computer hookup designed to allocate campsites in 21 national parks, nearly resulted in the collapse of the system.

Within a week after the system's operation was made public at the end of June, the number of calls coming in for reservations was fouling up most of the long distance circuits in Iowa, according to Tom Wilson of the National Park Service.

With only five lines going into reservation clerks, the system "simply couldn't field calls from 48 states," he said. Wilson added that automatic intercept tallies were running 2,500 to 3,000 per two-hour period on calls that couldn't be completed.

'Eliminate Hassles'

Intended "to eliminate the hassles confronting campers arriving at parks as early as 8 a.m. and 9 a.m. only to find them filled," six parks were placed on the reservation system last year.

Under this year's program, Wilson explained, prospective campers were to have been able to reserve sites at any of the 21 national parks – from Acadia in Maine to Cape Hatteras National Seashore in North Carolina to the Grand Canyon in Arizona – simply by writing or calling Park Reservation System in Cedar Rapids.

But when this information was advertised, nearly all prospective campers phoned rather than wrote for reservations. And because only a few thousand calls could be handled each day, "we were able to book only about 15% of the 9,500 available campsites," Wilson noted.

Campers now seem to be responding to the plea from the National Park Service that they write for campsites, unless they plan to visit the park within 10 days after making a reservation.

More Lines

Wilson also said the reservation system had installed four more phone lines, bringing the total to nine, the maximum permitted the system by the phone company.

Discussions with representatives of Park Reservation System, Inc., the private firm handling the program for the park service, indicate no problems exist with the IBM 360/145 or the modified Hilton Hotel reservation program used to run the system.

The company depends on a Dallas, Texas, firm, Compass Computer Services, Inc., for the computer, program and communications capability used by the park system.

By next spring, each of the 21 parks will be tied to the system through Terminal Communications, Inc. and Incoterm terminals.

Funds Late

"Unfortunately, Congress allocated funds for this project so late this spring that we weren't able to acquire park terminals in time," Wilson said. At present, the parks receive reservation information via telecopiers.

Wilson commented, however, that the problem of communication between the computer and the parks has been minor in comparison with the difficulties posed by the phone load. He added that in the long run, it may have been a mistake to locate the program's telephone center in a sparsely populated area which lacks the extensive phone circuits available in more urbanized centers.

Ky. Saves $2.4 Million Annually

(Continued from Page 1)

McReynolds stressed that "clearly we don't deliver the [same] level of services to those agencies that had their own computers, but we never promised them we would."

The goal from the start was to make state computing more cost-effective, so there was no raising of expectation among the computer users that might later lead to disgruntlement, he said.

Beyond the cost savings, consolidation has allowed all agencies to have access to the same level of computing. It has also meant that the centralized facility can offer TSO; none of the previous computer shops had the volume to justify it.

McReynolds, a former service bureau president, said he runs the Bureau of Computer Services as a utility that generates a profit and loss statement every month.

Some Freedoms

All agencies have their own data control, and the system is set up so the departments have a certain amount of autonomy and can "really run their shops," McReynolds said.

The consolidated center handles about 1,200 jobs daily, McReynolds said. It has a 38-member staff and a $220,000 monthly budget.

The 165 runs under OS/MVT with Hasp and has three IBM 3705 communications controllers and two 2701s to handle the system's extensive communications load.

Storage includes 44 spindles of IBM 3330 disk drives and 16 3420 tape drives. There are two 3211 line printers and an IBM 1288 optical scanner.

The system is currently using a mixed collection of software from the previous users, but McReynolds said he thinks the installation will ultimately turn to IMS to bring a uniform approach to file handling.

Asked if he had learned any secrets that would help others with consolidation projects, McReynolds recalled that "we were criticized a great deal because we did not publish a plan."

This meant the bureau's own broad plan was not distributed for public nitpicking and it was left with a lot of flexibility allowing it to make the changes on the fly, McReynolds said.

Or, as he puts it, "our critics didn't know what we were going to do next."

Pending FCC Approval

Datran, SP to Share Digital Transmission Routes

By Vic Farmer
Of the CW Staff

WASHINGTON, D.C. – Two proposed coast-to-coast data communications networks recently took a major step forward when the Data Transmission Co. (Datran) and Southern Pacific Communications Co. (SP) agreed to jointly develop and share transmission routes.

The plan is still tentative and requires Federal Communications Commission (FCC) approval.

According to the proposed plan, SP will buy the St. Louis-to-Chicago link built by Datran and in turn will lease back to Datran space for Datran's microwave transmission equipment.

The move, some industry experts claimed, is the only way Datran will be able to meet the deadlines for further development of its digital net. Both companies gain through the use of separately developed links that will plug gaps in coast-to-coast coverage.

A joint communique issued by Datran and SP predicted the agreement will allow both companies to pursue their "respective plans to [establish separate digital data] communications services on an expanded scale, with advancement of schedules and reduced capital requirements."

The two companies said they plan to jointly locate and build microwave networks linking St. Louis, Chicago, Boston and other points along the East Coast. SP will own the nonelectronic assets (transmission sites) but will make the sites available to Datran under long-term arrangements.

Each company will, however, own and operate its respective electronic equipment at the commonly shared sites.

SP has already agreed to provide Datran with interconnect services between Texas and the West Coast. Further interconnect arrangements are under consideration, according to the communique.

SP recently applied to the FCC for approval of its digital data transmission service and, while the service is similar to the AT&T Dataphone Digital Service (DDS), the SP service will draw on the technology used in the Canadian Dataroute [CW, Aug.7].

SP is currently providing a range of communications services, including private-line voice, video and facsimile on a coast-to-coast basis.

Datran's present operations provide private-line data communications services on its digital system to customers in Houston, Dallas, Oklahoma City, Tulsa, Kansas City and St. Louis. Extension to Chicago is planned for the fourth quarter of this year.

Software Error Fouls Printing Of New York Welfare Checks

By Edith Holmes
Of the CW Staff

NEW YORK – Lines continued to form outside the Long Island City welfare office four weeks after a city computer system failed to print names and addresses on the checks of clients whose case numbers ended in a five or six.

Ken Brodie, director of data processing for the city's Human Resources Administration, attributed the problem to a software failure in the dual IBM 370/158 system.

"Because the OS failure altered the information stored on our files, we had to back up and reconstruct our working disks from granddaddy tapes," he said. "In the process, the updates for one day's transmittals were omitted."

In particular, people who had recently become eligible for welfare payments were not included in the master file.

While Brodie could not pinpoint the OS problem, he commented the failure resulted when his operations staff "failed to follow procedures.

"But we are understaffed here," he added, "and in a crisis situation, you become aware of just how many more people you need."

Understaffing was the chief problem at the Long Island City welfare office, too, where clients waited in line for as long as three days in hopes of receiving direct assistance concerning their payments. While only one day's transactions were temporarily omitted and the error took about a day to correct, the problem extended into weeks for welfare recipients, according to a spokesman for the welfare office.

In speculating as to the cause of the increased delay, Brodie said the administration had recently converted to a distributive intelligence scheme of on-line data entry and edit.

"As of the end of July, a few welfare centers had not yet made the change from either a manual process of completing forms for the administration or an antiquated machine system where a paper tape provided the input to the central computer," he explained.

In some cases, inputs may not have been available, and centers may have been called on to repeat a day's changes in the eligibility of clients.

Both of these older methods of collecting and relaying information have now been phased out in favor of CRT data entry, according to Brodie. Now each center has a minicomputer with a CRT and a keyboard, and information collected on disks is delivered to the administration at the end of each workday.

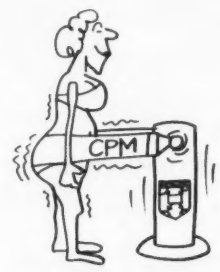
'His Welfare Check Was Late Again'

Did You Know?

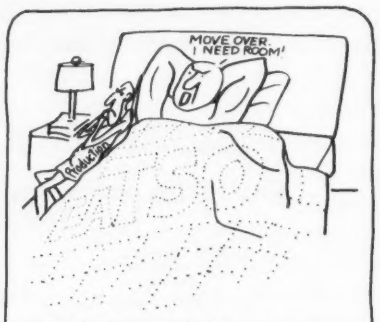
One of a series MAKING IBM INSTALLATIONS WORK BETTER

You can free IBM Hardware with ADR Software and gain more disk, memory, CPU use

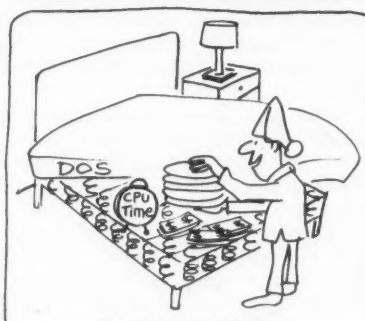
The LIBRARIAN SpaceSaver feature finds dead and unused disk space.



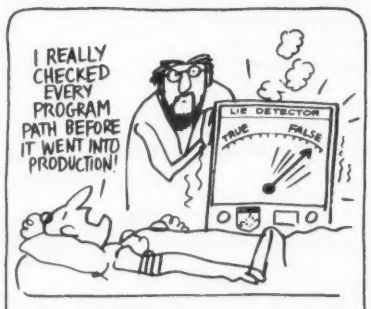
MetaCOBOL's Cobol Performance Monitor (CPM) helps operations reduce CPU and I/O time.



ROSCOE uses significantly less memory, disk space, and CPU time than IBM's TSO.



PI SORT saves CPU time and disk space under DOS.



AUTOFLOW reduces memory requirements by detecting unexecutable program logic.

SAM (the System Analysis Machine) lets you look before you leap into new hardware/software configurations.

ADR is in the software business to help you make the most out of your hardware. Our software products add value to your computing. They help you get more intensive use from the hardware which represents such a large part of your fixed costs. That's the big difference between "free" software and ADR's "free-ing" software. If you want to free your IBM hardware, look into ADR software. Just fill out the attached coupon or contact a nearby ADR office.

APPLIED DATA RESEARCH THE SOFTWARE BUILDERS®

ADR software products: in use at over 3,500 installations worldwide.

APPLIED DATA RESEARCH, INC.
SOFTWARE PRODUCTS DIVISION
Route 206 Center, Princeton, New Jersey 08540
Telephone: (609) 921-8550

Yes, I'm interested in freeing IBM hardware.

Name
Company Title
Address
City State Zip
Telephone
Computer Configuration

I am also interested in:
- ☐ The LIBRARIAN® . . . for security and protection
- ☐ MetaCOBOL® . . . for increased productivity
- ☐ ROSCOE . . . for on line program development
- ☐ PI SORT . . . for faster sorting
- ☐ AUTOFLOW II® . . . for maintenance and debugging
- ☐ SAM . . . for planning through simulation

U.S. offices in Atlanta, Boston, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Pittsburgh, Princeton, St. Louis, Washington, D.C.
Representatives in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Puerto Rico, South Africa, Spain, Sweden, Switzerland, Taiwan, West Germany

Session Participants Agree

Terminal Designs Tend to Undervalue Human Factors

By Ronald A. Frank
Of the CW Staff

STOCKHOLM – In most computer/communications systems, the incorporation of terminals into the design occurs too late, with little regard for the man/machine interface, according to an ICCC '74 session on human factors.

Most participants agreed that typical teleprocessing systems are designed from the computer on out to the remote terminals, and some suggested that the configuration should work in the other direction – at least where interaction with operators is concerned.

"The most persistent problem in terminal design has been operator unfamiliarity with the keyboard layout," according to Dr. Donald Davies, director of the National Physical Laboratory in the UK.

A major problem of this type occurs with operators who are normally typists and handle a terminal part of the time. In such cases, any differences between the operator's familiar typewriter keyboard layout and the arrangement of the terminal keyboard tend to be viewed as an annoying exception to the normal routine of entering information. As a result, the operation of the terminal is slowed.

"Too many of these types of distractions lead to a breakdown of the system," Davies said. In addition, many networks assume the operator is skilled in accessing the facilities and has some prior knowledge about the operation of the terminal.

In the network terminal in his office, it is necessary to set up a call, initiate the interaction, send or exchange information with another point in the network, terminate the interaction and release the call. This process "is far too complex," he suggested.

Telephone-Type Processes

Many of the procedures adopted for interactive teleprocessing systems are actually based on familiar processes which apply to the telephone network. But what is required in using the telephone is not necessarily appropriate or necessary for terminal operation, he said.

Each new terminal seems to have features designed to make them appear new or unique in some way. And even experienced users with different types of terminals can be inconvenienced by apparently small changes in terminal design. Thus a large number of human factors problems arise from the "misplaced ingenuity" of terminal designers, he told the attendees.

Among the points to remember in interactive systems is that the messages sent from the computer should appear human-like. Overterse messages, for example, tend to frighten some users and if a computer types out "attempted security violation" on a terminal, when the user has actually made a simple keying error, the CPU may be overreacting, he explained. One remedy for this situation is for the CPU to know the level of experience of the particular user so it can react accordingly.

The amount of information sent in each message is also important, Davies said. If the CPU sends too little information at one time, too many interactions with the operator will result, but if too much information is sent, the user may get confused.

A specific experiment with human factors was described by Dr. Christopher Evans of the National Physical Laboratory. He discussed a medical interview system installed in a British Hospital.

Using a Model 33 teletypewriter on the GE time-sharing network, Evans devised an interactive routine that would replace a doctor in giving a patient an initial information gathering interview. Patients were put in a room with the TTY that had been equipped with a special keyboard overlay so that the only answers that could be given were yes, no or a question mark meaning the question was not understood by the patient.

In each case the next response from the CPU would depend on the previous answer from the patient. It was found that in many cases the patients trusted the computer more than a direct interview with a doctor.

Evans pointed out that the main difference in this type of system was that the user was "naive" compared with skilled operators who would be familiar with interactive systems. Dialogs in these systems must be designed with care to take into account the varying degrees of training each operator may have, he said.

CW at ICCC

Another Opening

STOCKHOLM – More than 700 representatives from 32 countries were present for the opening of the International Conference on Computer Communications (ICCC) '74. A program of 24 technical sessions was scheduled for the international conference that lasted three days.

Among the applications-oriented sessions were those dealing with teleprocessing in the air transport industry, banking, the medical community and management. More than 50 U.S. delegates were registered at the conference.

Applications-Oriented Papers Play Larger Conference Role

STOCKHOLM – The Second International Conference on Computer Communication (ICCC) held here last week included an increased amount of applications-oriented papers, according to Dr. Stanley Winkler, president of the ICCC '74 executive committee. Attendance at the meeting was about 700 from 32 countries.

The goal of the conference, which is held biennially, is to have half of the sessions devoted to practical applications and half to technical, scientific and governmental subjects, Winkler noted. He admitted that more work has to be done in the applications area but said this sector of the program is growing.

The Stockholm conference was hosted by the Swedish Telecommunications Administration with its deputy director general, Torsten L. Larsson, serving as chairman of the organizing committee.

(The third conference in the fledgling series has been set for Toronto in August 1976 with the Canadian telecommunications authorities serving as host. It is hoped the program will include a demonstration of the Canadian "intelligent network" which is a packet-switched upgrade to the digital dataroute already in operation for Canadian users.)

U.S. Sends 40

As host country, Sweden had the largest delegation with almost 223 attendees while the U.S. had about 40 telecommunications professionals at the three-day meeting. Other countries with relatively large representations included Britain (55), France (39), Norway (32), Canada (27), Denmark (23) and Russia (13).

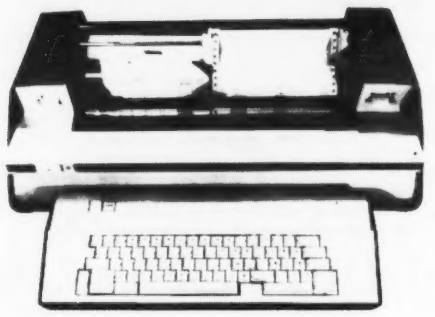
The ICCC series was begun in Washington, D.C. in 1972 in order to "provide an adequate forum" for discussion of the practical applications of computer communications problems, Winkler said.

It was an outgrowth of meetings held by technical societies who felt existent conferences were not concerned with the user applications associated with telecommunications, he added.

The ICCC executive committee includes 10 members who meet four to six times annually, Winkler said.

The ICCC is a nonprofit group and costs not covered by conference registrations are usually defrayed by the host government.

our model 30 applications-oriented printer/forms handler



gives you the paper-handling capabilities of two terminals for the price of one

What other printer provides these simultaneous forms-handling features of the Model 30 asynchronous Serial Printer

SPLIT PLATEN: INDEPENDENT LEFT/RIGHT OPERATION
typical applications

left platen	right platen
☐ Journal*	Invoices, Tickets=‡
☐ Message*=	Passbook Ledger Card‡
☐ Invoice=‡	Ledger Card‡
☐ EDP Scratch Pad*	Document=‡
☐ Data I/O*‡	Rental Agreement=‡
☐ Proof*=	Check, Deposit‡
☐ Inventory Card‡	Transaction Journal*=
☐ Unit Record Card‡	Control Ledger Card‡
☐ Labels*‡	Shipping Document=‡

*Journal Roll
=Tractor (Pin-Feed) Continuous
‡Unit Form – Front Insertion

REMOTE CONTROL TABULATION: HORIZONTAL
☐ Direct – via program
☐ Go to any one of 64 locations – forward/reverse – in one smooth motion
☐ Increase data throughput
☐ Minimize noise, wear, downtime

REMOTE CONTROL TABULATION: VERTICAL
☐ Rapid Line Selection
☐ Fast Form Out

FEATURES
☐ 192 Character Writing Line
☐ Up to Two 8½" Wide Forms
☐ Front Forms Insertion
☐ Ledger Cards, Checks, Vouchers, Passbooks, or even Intermixed Cut Forms, on Left, Right or *both* sides of Platen
☐ Two Color Ribbon
☐ Can be interfaced via RS-232 300 Baud
☐ Pin Feed Platens, Friction Feed, Overhead Tractor Feed
☐ Optional Keyboard Available

for full details, write or call
OEM PRODUCTS DIVISION
LITTON ABS
Automated Business Systems
34 Maple Avenue, Pine Brook, N.J. 07058/(201) 575-8100
IN U.K. – LBS, 27 Goswell Road, E.C.1, London
IN FRANCE – LITTON ABS/OEM, 9/15 Avenue Paul Doumer, 92504 Rueil-Malmaison

VOLUME KEY PUNCHING
(402) 346-0330
"JUST MINUTES AWAY"
AMERICANA KEY PUNCH
Redick Tower
Omaha, Nebraska 68102
and Ft. Worth, Texas

When you finish reading this ad, you'll know more about what's new in RJE than 99% of the data processing industry.

The last thing the world needs is another RJE terminal.

After all, thousands of them are already in use. And the number of models from which to choose is enormous. With that kind of competition, any new RJE terminal had better have a lot going for it. Ours does.

Video oriented RJE.

Four-Phase Remote Batch Systems are programmable. So you can use them as IBM 2780's. 3780's. Or HASP multileaving work-stations. Simply key in your choice at the video control console.

And our systems let you see what's going on. While your jobs are running at speeds up to 9600 baud, the 1152-character video console displays system status. Error messages. Prompts. Configuration options. Even dynamic line performance statistics. All clearly shown for greater operator control.

Four-Phase Remote Batch Systems are less expensive than IBM's. And we offer a wider range of peripherals including 300-600 cpm card readers. 300-1800 lpm printers. Plus a diskette or cartridge disc drive for fast program loading.

However, that's just the beginning.

It's like having 3 RJE terminals for the price of 1.

Most RJE terminals have a problem. Either their peripherals can run faster than the line. Or the line can outrun the peripherals. Either way it's inefficient. And costly.

That's why we've added disc spooling to our Remote Batch Systems. With disc spooling you can input one job from the card reader to the disc, output another from the disc to the printer, and receive or transmit a third. *All on the same system at the same time.* The result — your peripherals are used more efficiently, and system performance is increased.

And if you've ever cleared a paper jam after an unattended print, you'll appreciate another spooling feature — safety. Data can be received on disc and spooled to the printer at the same time. So you'll always have backup.

Spooling is a cost cutter too. Now you can receive batches on disc at 9600 baud for minimum line time. And print them later at lower speed on an economical 300 lpm printer.

Monthly rental for a complete spooling system with a 300 cpm card reader, 300 lpm printer, 2.5M byte disc drive, and video control console is only $1140 on a 1-year lease.

Expand to key-disc on the same system.

Maybe you'd be better off with fewer punched cards rather than a bigger RJE terminal. We can help you there too.

Our DATA IV/70 key-to-disc package supports up to 22 video key stations for source data entry and keypunch replacement. And you can transmit completed batches either at the end of the day or concurrently with data entry.

DATA IV/70 lets you enter. Verify. Search. Update. Insert. Reformat. And transfer records with ease. And its powerful conditional logic capability catches errors other systems never know are there.

To handle different department needs, both keypunch and typewriter style keyboards may be intermixed on the same system. And terminal screens can be formatted to resemble source documents for conversational fill-in-the-blanks entry.

Our shared processor systems have logged over 10 million operator hours. Many of them in some of the most demanding applications in data entry. So when you want to add key-disc terminals to your Remote Batch System, you're dealing with experience.

It processes too . . . with COBOL and RPG.

There's a lot of talk today about smart terminals — with minis and micros and such. From reading the ads, you'd think that anything with an LSI chip in it is a computer. But there's a big difference between a smart controller and a remote file management system.

For pre- and postprocessing of your data, our Remote Batch Systems contain a business oriented computer with the processing power of a 360/30.

And we support it with complete software including COBOL. ISAM. RPG. Sort. Assembler. Disc Operating Systems. And an extensive selection of utility software.

Best of all, Four-Phase Remote Batch Systems are backed nationwide by our own marketing, field engineering, and systems software personnel — all committed to total customer support.

To find out how Four-Phase Remote Batch Systems can help your organization increase terminal throughput, improve operator efficiency, reduce 360/370 overhead, and lower total system and communications costs, call our local Branch Office today.

The New Intelligent Remote Batch System.

Atlanta	(404) 351-0070	Hartford	(203) 549-0054	Philadelphia	(609) 234-0200
Baltimore	(301) 437-2552	Houston	(713) 626-5053	San Francisco	(415) 692-4360
Boston	(617) 245-9600	Indianapolis	(317) 923-1341	Stamford	(203) 357-1860
Chicago	(312) 694-3250	Kansas City	(816) 561-8989	St. Louis	(314) 862-3030
Cincinnati	(513) 771-0670	Los Angeles	(213) 640-1438	Washington	(202) 785-9222
Cleveland	(216) 661-0720	Miami	(305) 592-3620	Montreal	(514) 489-2562
Columbus	(614) 459-0414	Minneapolis	(612) 854-4461	Ottawa	(613) 729-9981
Dallas	(214) 634-2240	New Jersey	(201) 845-0252	Toronto	(416) 493-1839
Detroit	(313) 557-8844	New York	(212) 575-5656	Other Cities	(408) 255-0900

Four-Phase Systems

Four-Phase Systems, Inc.
National Marketing Headquarters
19333 Vallco Parkway, Cupertino, California 95014

I want to know more about Four-Phase Intelligent Remote Batch Systems.
Also send me details on other Four-Phase systems for:

☐ Source Data Entry ☐ IBM 3270 Simulation
☐ IBM 2260 Simulation ☐ Custom Terminal Applications

No. and type of present RJE terminals _____

Name _____ Title _____

Company _____

Address _____

Telephone _____ Ext. _____

City _____ State _____ Zip _____

DP Exports Affect Balance of Power, Davis Warns

By Ronald A. Frank
Of the CW Staff

STOCKHOLM – The export of computers is a cause of national concern for strategic as well as economic reasons, and a country "can lose valuable technology" by sending its DP expertise abroad.

This was the warning voiced by Dr. Ruth M. Davis, director of the Institute for Computer Sciences and Technology at the National Bureau of Standards, at Ifip '74 here.

The technology lost through the export of computers can adversely affect the country that parts with it and can enable the nation that receives it to accelerate development or production in areas that will be competitive with the "losing country," Davis said.

As an example, she cited the 1971 case when Britain wanted to sell ICL 1906A CPUs to the Soviet Union. The sale received the attention of both the President of the U.S. and the British Prime Minister because the two mainframes "were considered to have the potential to measurably improve the strategic position of a world power."

Speaking before the closing session of the Ifip Congress, Davis described the relationship between computers and the international balance of power by pointing out that most scientific and technical spokesmen now providing advice to national and multinational leaders are "insufficiently versed in the new computer-dependent technologies."

These spokesmen are primarily the product of the World War II "scientific ethic" and are out of touch with newer technologies, she claimed.

Today's policymakers and national leaders fear, misunderstand and distrust computers, and their support for computer science and technology is erratic as a result, she said.

There is no real understanding of computer technology as a national resource or as an instrument of power, Davis remarked, even through computer hardware, software and production technology are subject to more export controls than other nonmilitary products or services.

Computer technology, "hurried along by war, has turned around and in turn has hurried along the pace of war," she said. The first World War was fought with chemistry, the second with physics, "and World War III is being fought with computer science," Davis stated.

The first battles of World War III may well have occurred when mathematical formulations of strategies and clunter-strategies were tried out as war games on computers during the 1960s, she told the audience.

Computer technology can be a very effective technology for upsetting the blance of power without the catastrophic effect of military-oriented wars, she added. It is therefore imperative that computer scientists and technologists become far more active in providing advice to international policymakers.

Turning to some developing examples of international power being created through the use of computers, Davis called attention to the banking and retail communities. Both electronics funds transfer systems and POS are crossing national boundaries and in the process are changing international business operations, she said.

The health care community is another example of power crossing national boundaries through the international transfer of medical knowledge. In addition, multinational corporations, "one of the biggest of which is a computer manufacturer," are manifestations of international power, Davis told the attendees.

CW at Ifip

Legal Implications Unclear

Cross-Border TP May Pose New Political Problems

STOCKHOLM – The transformation of telecommunications from a national to an international discipline will create new legal and political problems, according to R.E. Butler, deputy secretary general of the International Telecommunications Union (ITU).

Addressing the opening session of ICCC '74, Butler said, "Cross-border traffic is still in its infancy but legal problems could become significant political issues if data transfer increases across national frontiers."

Easy transmission of data from one country to another and the corresponding rapidity with which information in data banks can be changed or cancelled introduces new aspects which have not been encountered previously in the government regulation of telecommunications, Butler told the attendees.

This capability will lead to a reappraisal of legislation allowing information files to be established, retained or transferred from one country to another.

"The value of computer/communications networks to insurance companies, banks and other investment organizations cannot be denied, but the extent to which the unrestricted flow of detailed information in these networks could give rise to actions unacceptable to governments has yet to be clearly defined," Butler cautioned.

CW at ICCC

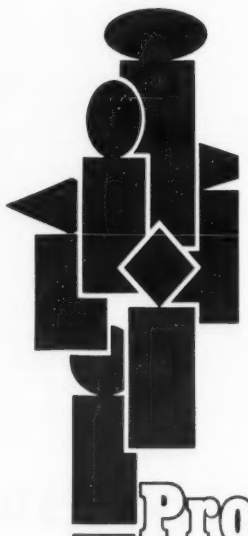
Once the need for control has been determined, then the manner in which control is exercised will influence the future development of computer/communications systems, he added.

A recent meeting of ITU study groups came to the conclusion that it would be beneficial to have an Integrated Services Digital Network (IDSN) "as an ideal worldwide communications network," Butler said.

But it was concluded that digital networks now being implemented or planned did not make it feasible to assume that a single ISDN would evolve. Consequently, separate specialized digital networks in various countries will continue during the 1973 to 1976 time span, and attention has to be focused on future integration of these specialized networks, he said.

A mechanism has been established within the Consultative Committee for International Telegraph and Telephone (CCITT) to allow for the future interconnection of specialized digital networks when they have compatible characteristics, he said.

These specialized networks as they are placed in service will be "superimposed on the existing analog nets and will be connected to them via arrangements which have yet to be defined.



Project Management...a People to People activity.

ware associates

OUR PHILOSOPHY

Ware Associates formed in April, 1970, is dedicated to producing not courses, but skilled personnel, not products and services, but answers to questions and solutions to problems.

Effective EDP Project Management entails more than technical know-how, it also involves handling people . . . the hardest part. **Ware Associates' Project Management course studies people solutions along with technical solutions.**

Who benefits by this practical three-day program?
• computer executives • senior analysts
• project leaders • systems managers
• other key members of project teams.

Because all participants work on actual case studies in teams, many organizations send complete teams who work together on the job. What skills do participants learn?

People-oriented skills • motivating people • reading the politics of your organization/relating to users • seeing yourself as a manager • making optimum use of time.

Technically-oriented skills: preparing time and cost estimates: determining current project status: answering management requests: making progress reports: bringing the project in on time.

OUR FACULTY

Robert B. Ware, CDP, President, with more than 15 years EDP experience, has performed in all segments of systems analysis and design, programming, operations, and maintenance of communications-based systems.

Kenniston W. Lord, Jr., CDP, Vice President, has served the data processing industry for more than a decade. As advisor on systems and data-base design for U.S., Canadian, and Australian companies, Mr. Lord has installed systems in inventory control, purchasing, personnel, truck-loading and general accounting.

FUTURE PROJECT MANAGEMENT COURSES

Sept. 4 – 6 Marriott, Chicago
Sept. 9 – 11 Marriott, Boston
Sept. 18 – 20 Summit, N.Y.C.
Oct. 2 – 4 Fairmont, San Francisco
Oct. 21 – 23 Fairmont, Atlanta

OTHER SERVICES

Systems Workshop
Computer Perspective Seminar
Training Directors' Workshop
EDP Trainers
Education Consulting
In-house Training

Write for brochure containing course outline and registration form

38A Main Street, Hudson, Massachusetts 01749 / 617-562-6921

Many Countries Planning Nets For Public Use

By Ronald A. Frank
Of the CW Staff

STOCKHOLM – More and more countries are in the process of transforming their existing point-to-point data networks into public data nets accessible to all users.

And in many cases this transformation includes the conversion of networks that originally were configured for private users only, according to G.D. Allery, a member of the Telecommunications Development Department at the British Post Office.

CW at Ifip

There are many points favoring the establishment of public data nets, Allery told an Ifip session dealing with computer communications problems.

These networks will provide universal coverage and full interconnectability for all users and will provide for the economical sharing of cost by utilizing common switching and transmission facilities, he said.

These nets will have a "high serviceability" capability because of redundancy and alternate routing characteristics, he added. And because these networks are interconnected, equipment designers will find it easier to standardize on network procedures and user-to-user protocols.

This, together with common tariffs, will encourage the use of low-cost, low-activity terminals, Allery said. In effect, the high activity terminals will be paying for most of the cost of the network and this will enable the smaller user with low volume to have equal access, he explained.

Some Drawbacks

But despite these advantages, the public networks have some drawbacks, since they are not always optimized for a particular application.

As a case in point, Allery said a high terminal usage net, restricted to a limited geographic area and requiring only simple facilities, might not be the most economic for data transmission. In addition, restriction of data access between one user and another is difficult to achieve within some of the planned public networks.

Among the international bodies now working on public data network standards, Allery listed the Consultantive Committee on International Telegraph and Telephone (CCITT), the Committee on European Posts and Telecommunications (Cept) and the Ifip TC6 Standard Group.

Among the countries studying or planning public data nets, the configurations can be broken up into switching and transmission categories, he said.

In the case of transmission, some nets initially will use the currently available analog transmission mode, while others will utilize digital transmission techniques.

With the second type, the entire national and later the international network will be synchronized to a single digital clock or a mutually synchronized family of clocks. In practice, this digital type will continue to utilize a mixture of analog and digital transmission media for some time, Allery predicted.

For switching purposes, both circuit and packet-switching techniques have been proposed, with some nets using both. Initially some nets will not take advantage of the fact that transmissions can be synchronized, but this will depend on the state of switching technology within the country, the British communications expert said.

(Continued on Page 8)

Bits and Bytes: Only a 'Pawn' in This Game

STOCKHOLM – The orders came by phone from Moscow: "Get the king at all costs." And the Russian forces moved forward on several fronts. This was war.

But there were no human fatalities – only fallen chessmen participating in the first World computer chess championship.

As it turned out, the Russians became the first world champions to win their gold medal; they used an ICL System 4/70 at the Institute of Control Science in Moscow, which was linked by voice telephone line to the lounge of the Birger Jarl Hotel here where the tournament games were played.

During the match games the lounge resembled a war room with operators at teletypewriters, CRTs and minicomputers, all trying to coax the last bit of human-like logic out of their chess programs.

Attempting to interpret the moves that would be made by the computer programs was chess master David Levy from Scotland, who triggered the computerized chess series in 1968 when he bet there would not be a CPU that could beat him in tournament play for 10 years.

The first tournament between programs was held in 1970 in New York as part of an Association for Computing Machinery conference, but the tournament last week at Ifip was the first to establish a world champion.

The Russians encountered stiff resistance from a Columbia University program called Ostrich whose master was Dr. Monroe Newborn. Newborn and one of his students, George Arnold, used a Data General mini installed at the tournament site with a TTY for I/O to challenge the Russian program Kaissa in the final game.

Eight countries and 13 teams entered the tournament with four teams from the U.S,, three from England and one each from Canada, Switzerland, Norway, Austria, Hungary and the USSR.

After the first championship medal was awarded to Michael V. Donsky, leader of the Russian team, Newborn said he planned to go home and modify his program.

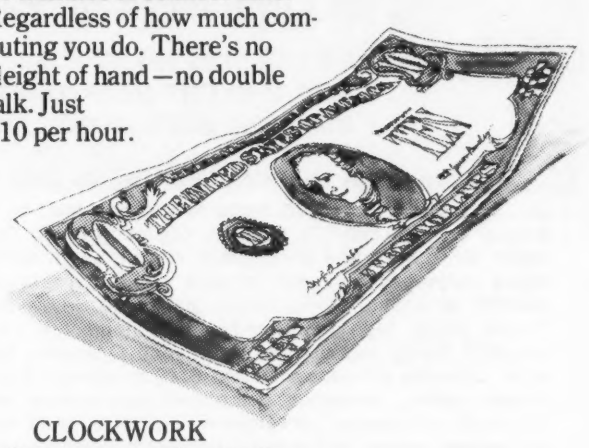
Mainframes used in the tournament ranged from the mini to a 370/195 used by the English program called Master, which was run on the huge system at the Atlas Computer Laboratory in England. MIT used a Decsystem-10 at the Stockholm Datacentral to run its program called Tech II.

The final game in the tournament came to an end at 1:30 a.m. local time, and a hardy group of chess devotees remained. At the height of the competition about 300 Ifip attendees crowded into the hotel lounge to see whether the machines they had helped to create could think and reason as logically as the humans that had created them.

Why your time-sharing bill doesn't make sense.

You get your time-sharing bill.
It's a lot higher than last month.
And you can't quite figure out why.
So you ask your time-sharing salesman to explain.
He can't.
You can understand their connect charge alright. $10 to $15 per hour. Plain and simple. Fine.
But then there's the "measure and resource utility", "computer resource usage", or "computer utilization unit" charge.
And that's where the whole thing falls apart.
Nobody seems to know exactly what a "computer utilization unit" is. But it costs money, and lots of it.
And your salesman says that's the way it is and *somebody* must understand it because they charge you for it. "And besides", he tells you, "everyone else pays it without question".
So on that comforting note, you shrug your shoulders and pay up.
It doesn't have to be that way.
Because First Data Corporation has come up with a way to price time-sharing that actually makes sense.
It's called CLOCKWORK.
And that's the way it works. You pay only for connect or wallclock time—$10 per hour, plus a low mass storage charge—as little as 1/5 of what you're paying now. There are no mysterious computer resource units. No questions. No suspicions.
THERE IS NO CHARGE FOR CENTRAL PROCESSING TIME.
And CLOCKWORK is no cut-rate minicomputer operation. It's one of the biggest, most powerful, advanced systems in the time-sharing industry—built around the DECsystem-10, the big system especially designed for time-sharing.

But the best part of CLOCKWORK is that your time-sharing bill will make sense. For example, if you use one hour of wallclock time—that's what you're charged for. Use 20 minutes of connect time and you get a bill for 20 minutes of connect time. Regardless of how much computing you do. There's no sleight of hand—no double talk. Just $10 per hour.



CLOCKWORK is that easy to understand.
Which means you'll probably want to know more about it. Like exactly what it will allow you to do and how fast you can start using it.
So just call or write our New York City Office* for details.
There's no obligation of course. And we'll get back to you with some very straight answers.
Like CLOCKWORK.

First Data Time-sharing Corporation
254 West 31st Street
New York, New York 10001
(212) 564-4333
Boston, New York, Washington

*CLOCKWORK is available only through our New York office.

Obligation of DP Technology

World Cooperation Sought to Deal With Social Issues

By Ronald A. Frank
Of the CW Staff

STOCKHOLM – There have been relatively few attempts to use the computer for the solution of social problems within a framework of international cooperation, according to Harold Borko from the School of Library Service at UCLA.

In order to rectify this situation, Borko called for the creation of an international social institution or laboratory, sponsored by Ifip, to study social problems.

Speaking at an Ifip session examining the social implications of computers, Borko said computers have been applied with great results toward the solution of problems within a single company, industry or country, but multinational and international social problems that can only be addressed by large-scale information handling and data processing capabilities have been virtually ignored.

CW Photo by Ronald A. Frank

Attendees try out IBM 370/158 system with 2M bytes of CPU storage and 1,000 bytes of 3330 disk storage.

CW at Ifip

He included among these problems natural disasters such as famines, wars, environmental pollution and the waste of energy and other natural resources.

On the positive side, Borko called attention to cooperation in weather forecasting, the sharing of data banks containing medical information, and simulation studies such as those preformed by the Club of Rome. He said these examples were too few and suggested there be a much greater effort at this type of international cooperation.

Computer technology has achieved a great deal in the areas in which it has been applied, but it has never been applied toward the solution of social problems on any significant scale, Borko told the Ifip attendees.

Computers have had an economic impact because this has been a planned goal, but social progress was always expected to be a by-product of economic progress, the speaker said. If solutions to social problems are desired then this must be defined as a goal instead of relying on chance results.

In many ways there is an "obligation on the part of computer technology to examine social problems on an international scale, since it is precisely this and other technologies that will cause many of the world's social problems within the next 50 years," Borko said. Among the most immediate problems that will face society within this time frame are nuclear escalation, famine, population growth, local wars and the gap between rich and poor, he noted.

To focus world attention on social problems, Borko proposed an Association for the Study on Social Implications in Science and Technology (Assist) to collect, organize and process relevant data. Such an organization would provide simulation capabilities to compare the effects of various proposed solutions and would in-

(Continued on Page 9)

Several Countries Establishing Data Networks for Public Use

(Continued from Page 7)

In recent years, interest in packet switching networks has increased and the CCITT has defined a packet as "a group of binary digits including data and call control signals which is switched as a composite whole. The data call control signals and possibly error control information are arranged in a specific format," he explained.

Essentially each addressed packet occupies a transmission channel for the duration of the transmission of the packet only, and the channel is then available for packets being sent by other users.

The interexchange of channels shared among many users on a demand basis makes it possible for a user with a single link to exchange data packets with a number of users at the same time, Allery told the Ifip attendees.

Facilities Differ

Several packet nets are currently operational or in an advanced stage of planning, but although these share common principles they differ considerably in the facilities offered and the procedures users have to follow.

Most of these nets serve either a specialized set of users or they provide national rather than international service. If no attempt is made to interconnect packet-switching nets, "such interconnection later could prove very expensive and inefficient," Allery warned.

Among the advantages of packet nets, the speaker listed an improvement in transmission error performance because of error control and built-in network redundancy. And because of the inherent data rate conversion performed, otherwise incompatible terminals will be able to exchange data with each other, he said.

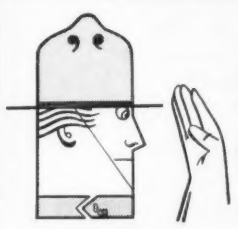
Users will enjoy some economies in the use of line plant by the inherent random multiplexing action of packet switching, and in the long term there will be savings in the interfacing of CPUs to the networks, Allery said.

However, users will have to bear extra costs over the short term from increased complexity in user interfaces, and more equipment will have to be acquired for formatting and error control, he said.

Users will also probably have to absorb extra switching costs for multipacket calls and there will be higher costs associated with reordering packets, he stated.

In order for worldwide networks to evolve, agreement on standards will be important and so far "commitment to standards as a goal for public data networks has been far from unanimous," Allery suggested.

The alternative would be a multitude of unique nets with expensive interfacing procedures between them. This in turn would restrict the range of facilities and services to users, he cautioned.



SMS presents
the Loyal Mounted "Family"

- SMS SERIES 100 MESSAGE DISPLAY*
- SMS 1440 CRT DATA TERMINAL
- SMS 5065 AUTOMATIC LABEL PRINTER

Meet the Loyal Mounted "Family" of SMS Systems

Our Series 100 and 5065 Systems are designed to increase job thruput on IBM 360/370 Systems operating under OS, VS1, VS2, HASP, ASP, MVT and MFT. Tape volume serial numbers, printer forms messages and disk mounts can be displayed. Put your printers in another room, move your tape drives to the library. Forget about tape label errors and hand printing, the Loyal Mounted family will liberate your Tape Operators from the console. Join the efficiency-minded SMS customers that include the largest banks, insurance companies, accounting firms, oil and chemical companies, government agencies, auto manufacturers and public utilities in the world that are presently using the "Loyal Mounted". Fill out the attached coupon and we will send you detailed system information and a customer list to allow you to judge in your own mind what the "Family" can do for you. We'll make you an offer you can't refuse.

*** Patented for your Protection**
U.S. Pat. # 3,792,447

RICK WEINMANN - DIRECTOR OF MARKETING
Scientific Measurement Systems, Inc.
26 Olney Ave • Cherry Hill, New Jersey 08003
(609) 424-5220

Name_____ Company_____
Phone #_____ Address_____
_____
IBM System(s)_____ # Tape Drives_____
Operating System_____
Send me a Proposal_____
Have a Salesman Call_____

ENTREX is touring the U.S.A. with a hot new key-to-disk system—System 280—lots of big system features but scaled to modest budgets.

Come. Bring your data entry supervisor. Showings Tuesday through Friday at 9:30 and 2. Just call to tell us when you're coming.

ENTREX
Burlington, Mass. 01803
617-273-0480

August 27 to September 11

Hartford, call **203/563-3866**
Richmond, call **301/997-3310**
Charlotte, call **404/634-6391**
Madison, call **608/221-3378**
Indianapolis, call **614/451-1058**
Los Angeles, call **213/475-0480**

Practical Sessions Reflect Changing National Interests

STOCKHOLM – The increased amount of applications-oriented and practical sessions at this year's Ifip congress is probably an indication that national DP interests are changing.

This was the considered opinion of Richard I. Tanaka, president-elect of the International Federation for Information Processing (Ifip), who said the triennial conference attempts to reflect the areas of greatest interest among the member nations.

While Ifip may have had more technical and scientific sessions in the past, Tanaka said in retrospect the past programs were probably the correct approach at the time.

CW at Ifip

In contrasting Ifip conferences with American Federation of Information Processing Societies (Afips) meetings in the U.S., Tanaka said the international gathering had more of a goal to achieve "commonality among the attendees, while at American shows everyone begins at the same level."

He added that this does not mean there is more of a tutorial emphasis in the Ifip international meetings, but rather there was greater importance attached to experts from various DP communities comparing notes on different solutions to similar problems.

Differing Backgrounds

One difference in planning international conferences is that the program committees cannot assume that all events are commonly known to a majority of delegates. In planning a U.S. conference, it is assumed that most attendees read the leading trade press sources and there is no need to repeat subject matter that has already been covered, Tanaka explained.

On the multinational level, however, approaches that seem basic in one DP community may have to be presented in order to foster an exchange of information with other countries.

The Stockholm Ifip Congress '74 was the fifth in a series that began in Munich in 1962. And that original Ifip meeting was actually an outgrowth of a June 1959 meeting sponsored by Unesco and called the First International Conference on Information Processing.

Eighteen national computer societies were represented at that conference; as of January 1974, Ifip counted 35 nations in its membership.

Toronto in '77

The next triennial meeting is scheduled for Toronto in August 1977 and a program chairman for this event is expected to be named within the next few weeks, Tanaka said.

This probably will not be a Canadian since the host country has enough work to do in planning the required facilities, he said, but Canadians will be included on the program committee.

The '74 Congress was probably the largest Ifip meeting to date and it was also the largest data processing conference held in Scandanavia, the president-elect said. While declining to speculate on the program for Toronto, Tanaka said one could assume that the trend to an increasing amount of applications-oriented sessions would continue.

Membership in the Ifip federation is made up of one delegate from each country to a General Assembly which meets in the fall of each year. Each country names its representative in its own way; in the U.S. Afips names the delegate (who is Tanaka), and in some countries like Brazil the largest user group names and sponsors the delegate as the official representative for that country.

While it is possible that different DP factions within a country may attempt to send their own delegates to the General Assembly, it remains for the country to decide who the official delegate will be. Ifip does not want to take part in such decisions, Tanaka said.

The General Assembly decides on general policy, activities, admissions, election and budget matters. Complementing this body is the Ifip Council which includes the officers and six elected trustees named from the General Assembly. The council meets twice a year.

The legal home of Ifip is Geneva and, unlike other DP organizations, the body is solvent, although Tanaka hastened to add that additional revenue sources would help carry out new programs.

Ifip dues are determined according to variable rules which depend on the size of the country, level of participation and other factors, Tanaka said. The U.S. pays 8,000 Swiss francs yearly for membership.

Asked if he thought that the work of Ifip was meaningful to the average DP user in the U.S. and whether membership was worthwhile, the president-elect said it was up to each country to disseminate information about Ifip within its country. In the case of the U.S., this work is the responsibility of Afips, he explained.

In some cases the government of the country plays a major role in Ifip participation. An example of this approach is the USSR, whose official membership is sponsored by the Academy of Sciences. About 32 representatives of the Academy were registered at the congress.

Social Problems Need World's Cooperation

(Continued from Page 8)

vestigate the effects of computer technology and its social impact.

In politics and government, size and complexity have resulted in increasing specialization of functions which makes effective policy development increasingly troublesome, he added.

"Bureaucracy builds its own technological image, uses the most advanced technological tools and usurps more and more of the administrative and policy-making functions of government. In addition, it invades the privacy of its citizens," he claimed.

Political leaders command a vast technology including computers and communications networks for "the manipulation and maintenance of power" and the opposition party or group in such circumstances is at a disadvantage, Borko suggested, implying this would also be an area to be studied by the social institute.

Social patterns are also affected by the increasing use of computers. Rapid urbanization gives urgency to city planning and public control of the environment and industrialization has resulted in increased liesure. This in turn has created pressures on the individual, the family and the community, he said.

In addition, population growth strains all social organizations and raises the possibility of "forced intervention to guarantee its control," Borko concluded.

"We've scratched the master file!"

Virtually impossible with UCC ONE. A tape management software package that manages your tapes and protects valuable data from loss or destruction.

UCC ONE provides real-time tape status and eliminates costly, time-consuming handwritten records. It also prevents errors in labeling, logging and scratching tapes.

In short, UCC ONE means better control and more efficiency. And it means you've heard "We've scratched it!" for the last time.

UCC ONE is just one of UCC's performance-proven software packages. For more details, call the Software Products Group at 214/637-5010, Ext. 3371. Or mail this coupon.

☐ Please send me information on: ☐ Please have someone call me about:
☐ UCC ONE
☐ UCC TWO (DUO 360/370). Lets you run DOS programs under OS control without reprogramming. Puts you in charge. Saves time, money. Prevents confusion.
☐ UCC TEN (Data Dictionary/Manager). For IMS users, this system centralizes, controls data definitions, provides powerful cross reference features, automatically generates data base control statements, facilitates new systems design.
☐ UCC FIFTEEN. Saves hours on restarting OS jobs. Simple, sophisticated software automatically corrects OS catalog, GDG biases before you rerun or restart.

Name_____
Title_____
Company_____
Address_____
City/State/Zip_____
Telephone_____

Mail to UCC, Software Products Group,
P.O. Box 74911, Dallas, Texas 75247

When you have the best people, you have the best product.

UCC
UNIVERSITY COMPUTING COMPANY
7200 Stemmons Freeway • P.O. Box 47911 • Dallas, Texas 75247
A Wyly Company

Editorial

'Hot Pursuit'

"There will be hot pursuit of tough laws to prevent illegal invasions of privacy in both government and private activities." – President Gerald R. Ford, Aug. 12, 1974.

President Ford is in an excellent position to press for legislation regulating data banks and the potential they offer for invasions of personal privacy.

He is acutely aware of the problems associated with data banks since he has headed the Domestic Council Committee on the Right of Privacy which has studied the issues – and possible solutions – since last February.

In addition, the political climate is extremely fertile at this time for privacy legislation, largely due to the Nixon Administration's continuing and willful violations of personal privacy.

The Congress, and apparently the new President, will be more than receptive to plans and programs to prevent any potential abuses in the future – to insure through law that no future President, administrator or government official can easily pry into the private lives of the citizens of the U.S. through wiretapping, eavesdropping or dossier collection in computerized data banks.

To date, the Domestic Council Committee has recommended tough laws for the public sector while recommending only voluntary action for private data banks.

Ford appears to be headed away from this approach, however, promising "tough laws" for both the private and public sector in his first address to Congress last week.

This stance creates both problems and opportunities for the DP community as well as for the solons in Washington.

The major problem area will be in identifying truly workable solutions to a problem that most now agree is of pressing national importance.

There are no simple solutions or easy outs when it comes to the difficult and complex problems of protecting personal privacy in computerized data banks. There just are no universal panaceas.

What is needed are general policy statements of national principles to govern the collection and dissemination of personal information – and an enforcement mechanism to ensure that the principles and guidelines are followed.

Too tightly restrictive legislation could stifle the necessary uses of computer systems in both the public and private areas, while lack of enforcement mechanisms could well make a mockery of any efforts in this area.

At the same time, the policy guidelines that are proposed and enacted should be as technically feasible as possible, even though this is one area where technology may have to take a back seat to public policy.

For example, if it is not technically feasible to protect all personal data to the level required by the expected laws, then some data will just have to remain uncollected.

In other words, the limitations of technological safeguards for personal data can no longer be used as a reason or an excuse for not enacting laws to protect individual privacy.

After all, the best protection for individual privacy is a slowing, if not outright stoppage, of the amount of data that is collected about individuals by organizations – both public and private – throughout the land.

The time for action is clearly with us, if it is not already overdue. There is no longer a question of whether there will be legislation in the privacy area, and hardly a question of when.

The only question that remains is the precise form of the legislation and its scope.

Any legislation passed must be broad in nature, covering both the private and public sector, but it should not be unduly restrictive on legitimate computer use by either business or government.

'After You, Alphonse...'

Letters to the Editor

Certification Must Be Developed As One Tool for Business Use

While I agree with Jens Christensen's letter to the editor [CW, July 31] in that the CDP program "could be developed into a meaningful measure of the professional," I disagree strongly with his contention that the "arrogant ignoramuses who also do not have college degrees" will and should be weeded out by a certification program.

On the one hand Christensen has been "privileged" to work with people without degrees, and on the other he wants them out of the profession.

A college degree certifies that one has spent a number of years in school and having perhaps paid attention once in a while, has been exposed to a great deal of wonderful data. However, it does not certify that one has converted that exposure into knowledge, or that that knowledge is useful in a business data processing environment.

A college education gives one a tremendous advantage in that it usually turns out a rounded individual, better prepared to meet contingencies, to reason and to communicate than one whose sole education consists of bits and bytes. The importance attached to a degree by some employers is, however, nonsensical.

At one extreme are those requiring a Masters or one year's experience (without a degree), at the other are those calling for a college degree (in any field) or experience in so many fields that the list makes the classified page editor happy indeed. One employer equates the five or six years of work required to get a Masters with one year's meager experience, while the other believes that having visited a campus is next to godliness.

The above disparity emanates from two sources: first, the inability of business to properly evaluate DP professionals and second, the inability of colleges to turn out graduates who are truly prepared to enter other than an academic DP environment.

Business will never be able to properly evaluate professionals, be they DP, civil engineering, nuclear physicists or medical professionals. Business must rely on education, certification and, above all, performance.

Certification is a good first step but still unreliable. Performance comes closest of all to giving business a measuring tool, but it takes time and the absolute and impossible need for someone who can truly measure performance.

The only hope lies in improving all three areas. Schools must develop more realistic faculties and curricula. Certification must grow far beyond its present limits. Performance measurement will improve in time with the other two.

Certification's growth must be carefully watched lest it become another Frankenstein. It must, first of all, measure knowledge and ability on its own and not give credit based on another institution's word. Secondly, it should not be a closed club such as the lawyers' state bars, but more like the accounting group: an accountant need not be a CPA.

Lastly, it must be of a limited duration; certification exams change and certificate holders relax and get sloppy and thus should be reexamined.

A certification program certifies that a person has a certain level of knowledge and ability; if it does so honestly and on a continuing basis, it can then be presented to business for use as its prime evaluating tool, but not hopefully, as its only one.

A.F. Curras

Newark, Calif.

'Translation' Requested

Please publish a working man's version of Tom O'Connor's farewell letter [CW, Aug. 7]. I assume he got involved with the Frontier Day Rodeo during the later part of July and either left town with the rodeo or lost his job (I really don't care), but I am anxious to get a translation of what must be a valuable message for those of us who are still "taking part in the performance."

Phil Curry

Edwardsville, Ill.

Few Alternatives for 'Used' DPers

It was with great regret that I read the articulate letter of Tom O'Connor in your Aug. 7 issue. What I regret even more is that he was much too accurate for comfort when he said the computing "profession" was retrogressive and that we are being "used" by others.

Let's face, it, we are a long way from being recognized as a viable force within the business world and I agree with O'Connor that such recognition will be a long time coming.

I wonder hown many other competent but frustrated individuals, unable to achieve any meaningful recognition, have left the ranks? I believe *Computerworld* would be of service to the industry by inviting and publishing comments from people who feel similary boxed-in and frustrated. If there are as many as I feel there are then it is a serious problem and should be aired.

As I see it there are several alternatives open and I present them in my personal inverse order of preference:

1. Continued mediocrity and prostitution (selling our services with no real satisfaction).
2. Unionization (not "professional" but at least recognized at bargaining time).
3. Absorption into the functional areas of business and disappearing as a "profession" (if you can't beat them, join them).
4. An expulsion of the charlatans who use us by catering to our egos followed by real leadership and even militancy on the part of the fighters who realize how much we really have to offer, with the eventual emergence of a "profession."

Name Withheld on Request

(Other letters and viewpoints on Pages 11 and 12.)

Letters to the Editor

He's Not Buying Story And Not Selling Stock

I am getting more and more upset with the fact that once certain people are given a regular public forum they are allowed to express personal opinions as fact, when in reality the facts are the opposite.

Take Herb Grosch's July 31 column entitled "The Honeywell Mess." The theme of the article is that Honeywell is sick, its sales are down, Series 60 is not doing well, Phoenix is in turmoil and Honeywell will fail. Wow! I happen to own Honeywell stock and decided I had better study the facts in Grosch's article to see if I should sell my stock. Here is what I found.

First paragraph – "a fundamental sickness." The only supporting evidence given is that Grosch has replaced Honeywell as third best collapsing survivor with Burroughs in his fantasy world. *No facts.*

Second paragraph – "This column had its genesis in the news that HIS is laying off 600 employees in the Boston area." I consider this statement a fact since the author says so.

Third paragraph – ". . . informal reports around the trade are that Honeywell's order book is shrinking." *No facts.* "Informal reports" is another way of saying "rumors." Fact – page 19 of the same issue of CW has a formal report of a 14.4% increase in Honeywell sales.

Fourth paragraph – Series 60 "looks good but not startling." The use of MOS technology is not exactly novel." The whole theme of this paragraph seems to be that a "good" new product line is not enough. It should be startling and have novel technology. *No facts.*

Fifth paragraph – Clancy Spangle talked about MIS instead of giving a Series 60 sales pitch. All this says is Grosch likes sales pitches more than MIS discussions.

Sixth paragraph – "Phoenix is in turmoil. Hatchet men come and go, senior people are fired or shipped out and newcomers are dragged in off the streets . . ." Oh come on! Must be pretty dumb hatchet men to come and go. The rest of it isn't worth commenting on except to say if I were trying to describe "turmoil" I probably would have made up a similar story. *No facts.*

Seventh paragraph – Honeywell stopped publishing the *Honeywell Computer Journal* and Grosch "was shaken" to hear this. *Two facts.*

Grosch closes out the paragraph by dreaming up a bunch of unsupported statements to allow him to reach an unsupportable conclusion.

After looking for the facts I found that this was just another one of Grosch's luncheon speeches intended to entertain and not a factual article intended to inform. I guess I'll keep my stock.

Patrick J. Toomey
Framingham, Mass.

Unnecessary Kick

Herb Grosch is new to journalism, and he has much to learn. One by-law among newspaper men is that you don't write to hurt people unnecessarily.

A journalist with integrity does not allow personal vindictiveness to surmount objective reporting.

Computerworld doesn't need cheap sensationalism to sell subscriptions. It needs good, balanced reporting and humanity – in the understanding that all the vendors in the DP field are trying their best to hack it.

They are not all equally successful at any given moment, and no one needs or merits an ugly boot kick such as Grosch gave Honeywell.

At the very least he should consider the effect of his words on the bobbly stock market.

Dee Morgan
Washington, D.C.

Retraction In Order?

"The Honeywell Mess" represents a fine example of shoddy journalism.

Since the inception of *Computerworld*, my associates at Western Twenty Nine have been subscribers. On the whole, we enjoy the publication – but we also enjoy being professional members of the computer industry.

We do not believe the computer industry's interests are best served by the derogatory comments printed about Honeywell.

Western Twenty Nine is a user of the Honeywell 6000. Our relationship with Honeywell has been rewarding and professional. We firmly believe the computer industry needs a strong competitive company. Honeywell fulfills this need.

It seems unfortunate that CW finds it necessary to retain a certain type of reporter who identifies with personalities like Don Rickles. We believe a full retraction is most definitely in order.

Certainly Western Twenty Nine and many other Honeywell customers believe this to be proper.

Patrick T. Brent
President
Western Twenty Nine
San Francisco, Calif.

The views expressed in the column Black Hats/White Hats are the personal opinions of Herb Grosch and do not necessarily reflect the editorial policies of *Computerworld*. Ed.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Coaching Management: The Right Man Will Help Carry the Team

Viewpoint

By Eugene E. DeBoer
Special to Computerworld

Many people have written and are still writing about the failure of data processing to fulfill the preconceived ideas or objectives of a corporation's information requirements, but perhaps it is the make-up of man himself that causes the inadequacies of the interface between DP and the business world.

The business world can destroy a good man and a man can destroy a good business. The old problem of finding the right man for the right position is critical in DP because it is the focal point for gathering information, and the history of information and making this information readily available for management use.

It would be most beneficial to the business world and the DP community if management would adapt a more competitive stance – like team athletics, where results and not excuses count – when choosing individuals for management positions in a DP environment.

In team sports the manager has to deliver a winner or he isn't around long; this type of philosophy would put the pressure on the DP management to produce results or make necessary adjustments, even if they are personnel changes, to fulfill the information needs of a corporation.

Bad management as the result of the Inverse Peter Principle is prevalent within the DP environment. It must be exposed and dealt with before any identifiable improvement of DP processes can take place.

I feel there are several solutions to exposing bad DP professionals who do not get proper results within a given time frame.

One solution is to develop a system to educate all concerned, but mainly the executives of a corporation, on the need to measure the results of their DP environment. The role and potential of DP within a corporation must become common knowledge, not a mystery, to management before any significant improvement can come to pass.

Another possibility is to create interest within management to understand the DP function and its relationship to other functions in a corporation. If we exorcise the belief that the average person can't comprehend DP, there is no mystique to what the computer can contribute to the profit margin.

Let everyone know that the function is as good as its people. Errors are not the fault of the computer, but the fault of systems, programming, operations, clerical and other personnel that participate in generating the needed information.

What would be wrong if a company compared its installations with the acknowledged industry leaders of DP? Or crossed industry boundaries to see how computers are utilized elsewhere to contribute to profit margins? How many installations are adquate, let alone doing an excellent job?

We have to change the reputation of DP and its role within the business world. How many times do DP people receive requests from user groups and come back saying it can't be done or will require more resources, when the real reason is the manager doesn't want to rock the boat or has lost his incentive to excel? Who suffers in this case – the people in the DP department, DP's reputation, a corporation? In most cases management is too ignorant of the facts to know otherwise.

The responsibility of exposing the dilemma of inept management belongs to everyone: vendors, software houses, facilities management, consultants, systems, programming, operations, education and a host of organizations affiliated with DP. Even though many organizations earn their livelihood because of the ineptness that prevails in DP, we should, as a group rectify our reputation.

We have an obligation to society, ourselves and our corporations. We don't stand for ineptness in athletics, so why should we stand for it in our professional environment?

Eugene E. DeBoer is employed at Revere Copper and Brass, Inc., Rome, N.Y.

Algorithms May Be Good Data Detergents

The Taylor Report
By
Alan Taylor, CDP

"Data cleaning is like industrial design; everybody should use the professional services of experts, but most feel that such things are extras or frills." This comment on the recent articles about file cleanliness was made by Richard S. Heiser from Litton Systems, Inc.

Heiser was constructive about the matter. Instead of complaining about the failure to seek expert advice, he looked at the problems of using experts and came up with some solutions regarding the weaknesses of experts. Here are some of his comments.

"The statistical approach to cleanliness sounds very complicated to me. Every time I talk to a statistican he wants a huge sample and gives wide ranges with low confidence percentages.

"Files aren't homogenous, either. The first reel usually contains the nasty old records that were converted off the punch cards way back in '59. My feeling is that errors are complex and hard to detect.

"The few that can be detected/corrected with a machine should be used to jusify forming a new, public body of people and machines to operate in a 'gaming' or 'Internal Revenue Service' mode. The IRS uses a heuristic polynomial program to spot the records where the target payoff from manual investigation seems likely.

"I see this gaming as a continuing activity and would be willing to take lessons out of the IRS book. But, unlike IRS, the group should operate in public, sometimes doing special studies on the characteristics of the data files for management.

"The data cleaning group will be the natural place to check for special-purpose file analyses (histograms, field diagrams, two-way tables, etc.)."

Simpler Approach Possible

Well, it is a good approach. But I can suggest another, simple, version that covers most of the suggestions and provides file cleaning as a continuing activity.

My approach would be to design a monitoring algorithm for cleanliness which, after testing, could be incorporated into any program. In this way the expertise would be available to all, without having to submit the files to some central or public agency.

Even better would be to provide a number of algorithms to handle different needs and different situations. These could be selected, by each customer to meet his individiual needs. The algorithms could be made to reflect the tastes of the auditors, as well as data processing managers, and provide different levels of independent control.

Unlimited Possibilities

Imagine the situation if a library of such algorithms existed. One might be organized for handling name and address duplication in two tape files. Another could handle the cleanliness of a single on-line inquiry system. Yet a third could address the cleanliness of a stream of input based upon the number and type of adjustments that are received each day.

There is no end to the number of complex jobs that could be performed through the use of such algorithms. Cobol, more than any other language, is capable of providing for them.

This is the approach I would like to see the professionals taking to dirty files. Certainly I would like to see the firms specializing in file cleaning continue, but I would also like to see the development of special approaches to different parts of the problem which could be plugged into the day-to-day operations at the actual site. That will give a stronger, more widespread appreciation of both the dangers and the solutions available to a very important professional problem.

© Copyright 1974 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of *Computerworld*.

Letters to the Editor

A/V Materials Are Proven Effective Training Aids

Regarding the article, "Training Program Finds Strength in Tradition" [CW, Aug. 7]. The article glorifies exactly what has been wrong with DP training for so long and downgrades the professional methods that we who provide training to the DP community have been trying to promote. Consider the following points:

(1) The statement (paraphrased) that live in-house training alone is more effective than audio-visual training is patently and demonstrably false. A recent study at Rutgers University concluded that the use of standard audio-visual packages (in this case from one of the big three – Edutronics, Advanced Systems, Deltak) is of equal effectiveness across the board, and more effective for concepts (". . . getting the point across"), when compared with live instruction.

Another study (by the Division of Academic Research and Services, Unversity of Pennsylvania) concluded that television was of high value in teaching principles, concepts and rules, while oral presentation is of low value.

(2) "Films are expensive" – the yearly cost of leasing the entire library of audio-visual materials from any of the "big three" is less than half the cost of an entry-level secretary, let alone an experienced instructor. Films provide more material and are faster and more effective than any live instructor, so training time decreases, thus decreasing cost.

(3) "Films don't usually receive rave reviews from students." I'm always suspicious of students who know what they should be taught and how. Comparative results are the only basis for "student review." Possibly the problem at Mony has been a lack of attention to the quality of the A/V materials. If the current vendor has low quality films then Mony should examine other vendors' offerings.

(4) "Films are used as diversionary tactics." Diverting a student is not a function of the training process. The films either have intrinsic merit or they don't. Normally we divert attention from something that is inadequate or boring. This sounds like a revealing commentary on the "traditional way."

(5) Lucy O'Neill is "unable to estimate the cost of Mony's DP training effort" and O'Neill contended ". . . its continuation since 1958 testifies to the program's success." The continuation of a program without quantified results and with no apparent regard for cost is more indicative of a lack of interest than success.

I regret that *Computerworld* has chosen to hold this training program up to the DP community as an example of what should be done.

Donald L. Sullivan
Vice-President

AV Products, Inc.
Wakefield, Mass.

The story on Mony demonstrated how one firm meets its training needs successfully. Of course, Mony's way might not apply to every other company or situation. While a vendor of audio/visual materials would naturally disagree with Mony's lack of emphasis on such materials, this deemphasis certainly doesn't make Mony's training techniques outmoded or unworkable.

***Computerworld* is trying to promote training and other professional development by pointing out – through many different application stories – the wide range of techniques available to DP users. Ed.**

Analysts Misunderstood

R.F. Mittleman's letter in the July 31 issue ("Nonprogrammers Not Good System Designers") annoyed me in its sweeping generalization.

It seems that he, like many data processing people, doesn't really know/understand the responsibilities of a systems analyst.

Basically, the systems man is responsible for the design of a system, not for the design of a program. Granted, he writes the program specs, noting in narrative form what the program is supposed to do, but it's the programmer's responsibility to produce an efficient program.

While Mittleman's last point, "More problem areas are discovered when the user starts to use the system," is a complete topic in itself, all I'll state now is, "Whatever happened to good systems test planning and conducting?"

R.F. Becker
DP and Systems Manager

Teledyne Wisconsin Motor
Milwaukee, Wis.

Call for Cooperation

Regarding R.F. Mittleman's letter in the July 31 issue. Over the years, many articles have created intensified ill feelings between systems analysts and programmers.

Why can't we all learn to admit that both groups have highly professional and competent members. That one group is not necessarily "better" than the other. That each group has its share of nincompoops. That some individuals can function equally well in either group, whereas others can only program or only design.

And most important, that nothing is to be gained by anyone by downgrading the ability of others.

Despite any predictions about future computers that will program themselves and eliminate programmers, we will all have to live and work together for quite a few more years.

By respecting each other's abilities and recognizing their problems, we can together build better systems that will enhance our professional image. And that is an admirable goal for all of us.

Richard E. Molling
Senior Systems Analyst

The Clorox Co.
Oakland, Calif.

What Caused Mixup?

Alan Taylor goes to great lengths to analyze the Honeywell and Memorex billing mixups [CW, Aug. 7]. Could he explain why the figures and captions are mixed up?

Israel Landy

Brooklyn, N.Y.

The photos were inadvertantly switched in the production process. Ed.

Learn What You Need to Know About Contracting for Computers and EDP Support Services - In One Hard Lesson

A two-and-a-half-day seminar that can help you protect your EDP investment--and your system.

Conducted by Roy N. Freed, the well-known expert in computer-related law, this unique seminar can give you the information you need to get good, effective contracts from the vendors that supply your EDP installation. And in an industry that's famous for its "promise them anything" attitude, this information can be invaluable. It can save you money. It can save you time. And, most important of all, it can help you protect your installation from disruptive discontinuities.

Here are some of the subjects covered in the seminar:

- The lease or purchase of computer systems.
- The lease or purchase of separate hardware or software.
- The purchase of time-sharing, data processing services and consultation.
- The use of facilities management.

And here are some of the things you'll learn:

- How to recognize opportunities to negotiate.
- How to establish goals and state conditions--before it's too late.
- How to place yourself in a strong bargaining position.
- How to insure on-time delivery of exactly what you've bargained for.
- How to reach an agreement that protects the security of confidential data.
- How to set reasonable performance standards for warranties.
- How to provide tax savings through proper wording of contracts.

Free Resource Notebook

You'll also receive a valuable reference notebook which will back up the information you'll receive at this meeting. *The notebook will include sample vendor contract forms.*

Roy N. Freed, a leader in this field.

Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in private practice with a prominent Boston law firm.

He has authored many articles on the various legal aspects of computers--including "Computer Frauds--A Management Trap" *(Business Horizons)* and a book entitled "Computers and Law--A Reference Work." Mr. Freed will personally conduct the entire seminar.

Should you attend this seminar?

If you're involved in the purchase of EDP equipment or services, the answer is a resounding "yes." Whether you're a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm, this seminar will pay for itself many times over. You just have to read the pages of *Computerworld* to realize how frequent supplier problems are--and how costly and disruptive they can be. This seminar can help you get what you want when you want it. It will help your company, your industry and you!

Times, places and cost

The Fall schedule includes three locations:

Sept. 25-27--Regency Hyatt Embarcadero, San Francisco
Oct. 23-25--St. Francis, New York
Dec. 4-6--Regency Hyatt O'Hare, Chicago

Total cost for the entire seminar, including the complete resource notebook, continental breakfasts, lunches and coffee breaks, is $295.00. Hotel rooms, if required, are not included.

Note: Enrollment must be strictly limited, and our other seminars were sold out. So don't wait until it's too late to enroll.

Contracting for Computers and EDP Support Services

THE EDP SEMINAR SERIES
Sponsored by COMPUTERWORLD

To: **Ed Bride**
Vice President Editorial Services
Computerworld
797 Washington St., Newton, Mass. 02160

☐ Reserve place(s) at the seminar checked and send a copy of your descriptive brochure.
☐ Check enclosed ($295/per person) ☐ Purchase order enclosed
☐ Bill me (I understand that my registration cannot be confirmed until you have received my check or purchase order.)
☐ I'd like to attend the seminar I have checked, but cannot make a reservation at this time. Please send me your brochure. I understand that enrollment is limited.

Check City:
☐ **San Francisco Sept. 25-27** ☐ **New York Oct. 23-25** ☐ **Chicago Dec. 4-6**

Name _____

Title _____ **Company** _____

Address _____

City _____ **State** _____ **Zip** _____

Phone _____

In Datapro Survey

Utility, Support Packages Grab Honors

By Don Leavitt
Of the CW Staff

DELRAN, N.J. – Utility and system support packages dominate the 1974 "honor roll" of proprietary software compiled by Datapro Research Corp. and there may be a perfectly good explanation for such a bias, according to *Datapro 70's* software editor Mary Lou Roberts.

Even though the "not invented here" syncrome is dying, she said, users still feel a need to shape applications packages to installation needs or desires. Regardless of who does the custom work – the user, the vendor or both – the user sees this as a factor that detracts from the value of that class of package.

Twenty packages qualified for highest honors in Datapro's survey, and only three of these were application oriented. Eleven of the 20 were repeaters from last year's honor roll, Roberts added, even though the qualifications for listing are more stringent this year.

In May of 1974, Roberts and her staff mailed a survey questionnaire to about 8,200 subscribers of the Datapro information services. They received valid responses from 583 users with ratings of more than 1,400 packages.

The questionnaire asked about the environment in which the package was used and then asked for ratings – excellent, good, fair, poor – in each of five catagories (overall satisfaction, job throughput/program efficiency, ease of installation, documentation and vendor's technical support).

Respondents were also asked if the package performed as advertised (and how soon?) and if it required modification (if so, to what degree?). The user was also given the opportunity to cite the major advantage and disadvantage of the package being rated.

With a base requirement that at least six users had to rate a package before it could be considered for the honor roll, Datapro also computed a weighted average for each package in a manner similar to many college grading systems: "excellent" was weighed as 4 and "poor" as 1. The number of responses for each rating within each catagory was multiplied by the weight, and the average was taken by dividing the sum of the products by the total number of responses.

The criteria for making the 1974 list was an overall satisfaction rating of 3.5 or better and a rating of 2.8 or better in each of the other four catagories. Charts prepared by Datapro show that this second requirement kept several generally popular packages off the honors list.

Summing up the survey results, Roberts also noted that vendor's technical support "appears to have replaced 'documentation' as the users' chief complaint.

Copies of the survey report, including detailed charts of the ratings for some 50 packages and summary charts on a number of others, are available for $10 per copy from Datapro at 1805 Underwood Blvd., 08075.

Able–Evansville Data Processing Corp.

Alltax-Management Information Service*

DOS/Ditto–IBM

DOS Dump/Restore/Copy–Westinghouse Tele-Computer Systems Corp.*

DYL-250–Dylakor Computer Systems, Inc.*

DYL-260–Dylakor Computer Systems, Inc.

Easytrieve–Pansophic Systems, Inc.*

Epat–Software Design, Inc.*

Fast Dump Restore–Innovation Data Processing, Inc.

Grasp–Software Design, Inc.*

The Librarian–Applied Data Research, Inc.*

Minicomm–GTE Information Systems

MMS General Ledger–Software International Corp.

Optimizer II–Capex Corp.

Panvalet–Pansophic Systems, Inc.*

Quickjob–System Support Software, Inc.*

Sprint–Jason Data Services

Total–Cincom Systems, Inc.*

UCC One (TMS)–University Computing Co.

UCC Two (DUO)–University Computing Co.*

Datapro cited these packages as meeting the qualifications of the 1974 "honor roll of proprietary software." The 11 marked by asterisks are repeaters from 1973.

'Stop' Protects User Storage During Tests of CICS Program

HACKENSACK, N.J. – Programmers working with IBM's Customer Information Control System (CICS) can run tests in a production environment and still maintain system stability by utilizing the Storage Protector (Stop) package from On-Line Software International (OSI).

Stop consists of a module similar to other CICS application programs. Acting as a test bed for the program under development, Stop will extract, interpret and execute all instructions in the user's program.

On encountering any actions defined as illegal in the CICS environment, Stop terminates the monitored task. All Stop-controlled operations may also be recorded on a transient data queue, providing an historical trace of logic flow.

In operation, Stop allows the CICS user to test new programs without danger of affecting storage external to the task being tested. Normally, a task has access to all storage within the CICS partition, but Stop includes a capability to locate illegal storage references before they cause a partition abort.

While the optional log of events leading to the error condition offers insights into how to correct the problem, a CICS-formatted dump generated by Stop and including definitive diagnostic information adds another debugging tool, OSI noted.

While Stop is often used on development of individual CICS tasks, it can also be used to provide a test bed for an entire system when the interplay between tasks must be evaluated, but programs outside the new system have to be protected.

Stop permits modifications of various areas, including user code in the program under test, the transaction work area and some parts of the task control area. In addition, changes can be made in the task's transaction storage, terminal I/O areas and in Registers 14 and 11.

Stop is now available for $4,000 from OSI at 411 Hackensack Ave., 07601.

DOS Partition Lends Dormant Peripherals

RANDALLSTOWN, Md. – DOS and DOS/VS users can now "lend" peripherals normally assigned to a long-running job in one partition to a shorter job in another partition, with the Reset-It logic from Baltimore Data Services.

Key-in Okays Use

In effect, Reset-It allows the user to override "Unit Currently Unassignable" or "Conflicting I/O Assignment" messages with key-ins okaying the use of specific peripherals for new jobs, as long as they aren't being actively used by the job to which they were originally assigned.

In normal DOS operations, all the peripherals needed for any part of a job are assigned to that job at runtime even though some devices – usually printers – may not be needed until nearly the end of the run. Reset-It provides a means of using the devices in the interim.

The only hazard in using this approach, the vendor said, lies in misjudging the runtime of the jobs involved. The job that originally had the peripherals will at least attempt to take them back when it is ready for them.

Installation of Reset-It requires a minor alternation in the user's operating system. An object version of the coding can be purchased for $90 from Baltimore Data Services at 3614 Blair Ave., 21133.

Sycor 250 Gains Edit Language

ANN ARBOR, Mich. – Users of the Sycor 250 intelligent display station can now use the intelligence of the unit to create its own programs with the Field Instruction Language (FIL) system from Sycor.

The new capability makes the 250 "the only user-programmable, IBM 3270-compatible terminal display system" on the market, a Sycor source claimed. FIL permits users to create a broad range of interactive data validation routines but doesn't have the scope of the Terminal Application Language Sycor developed for its 340 intelligent batch terminal two years ago.

FIL consists of fill-in-the-blanks formats and general-purpose logical expressions. These augment existing application-oriented CRT screen formats, including those generated by IBM's CICS, IMS, TSO and Video 370 programming support packages, Sycor said.

The data entry editing capabilities of FIL include capacity control, check digit verification, range checking, table comparison and arithmetic operations, all at the field level if required.

FIL error-checking programs are created on the terminal screen and then stored as source statements. Object code is generated as the program is needed through an assembler/interpreter system stored in the 250.

Four to 14 Bytes

The basic Sycor 250 has approximately 1K bytes of programmable memory, expandable in 1K-byte increments to approximately 6K bytes maximum. Each instruction generated by FIL takes from four to 14 bytes of terminal memory, the company noted.

Programming of the edit functions is easier on the 250 than on the central computer but, more significantly, FIL users avoid the cost of transmitting data which may prove to be incorrect after centralized checking. Line costs are therefore reduced and the lines are kept clear for work that must go between the central site and the terminal.

FIL is available at no cost to Sycor 250 users, the company said from 100 Phoenix Drive, 48104.

Whatever LAYLA wants LAYLA gets

Improve the use of your resources. Whenever project resource scheduling is necessary – put LAYLA, our highly efficient computer system to work.

LAYLA gets her man (or men) for you everytime. And, always in your best cost saving interests.

By enabling cost conscious management to:

- **analyze staff capacity**
- **forecast project delivery & cost**
- **measure project costs**
- **monitor project status**
- **analyze completed projects**
- **provide information for future estimates (such as manpower utilization)...**

What's more, LAYLA is flexible. She's easily revisable to any computer system. And, among her other more notable talents, she can schedule multiple projects, provide a built-in optimizing algorithm and charge costs to user depts. or to overhead.

LAYLA has found many a home in data processing centers, banks, manufacturing and distribution facilities, insurance companies, government agencies, institutions, utilities and wholesale and retail establishments.

In fact, her project application potential is limited only to the extent of your imagination.

Make LAYLA your most resourceful resource. She's yours on a time sharing, short or long term lease or outright sale basis.

For more detailed information revealing LAYLA's special features and vital statistics – write: ECI Software Corporation, 87 Crescent Rd., Needham Heights, Mass. 02194.

Or, for a more prompt personalized introduction – phone: (617) 449-4140.

WHY NOT ?

In 1967, when few people knew what telecommunications meant, and even fewer believed that software could be packaged, we asked 'why not?' Today, turnkey systems has begun its eighth year of supplying quality on-line software to a world-wide market. TASK/MASTER, our telecommunications monitor, is now installed throughout ten countries where it has proven itself to be the most popular and successful competition of CICS, IMS or any alternative approach. Another turnkey product, KEY/MASTER, is the industry's most advanced on-line data entry system.

turnkey systems' success has been the sole product of a small group of intelligent, aggressive, self-sufficient and unique people. If you share those characteristics and our belief in the future of on-line systems, we would like to hear from you.

tSi

turnkey systems inc.
one eleven east ave., norwalk, conn. 06851
(203) 853-2884

Independents' VM/370 Support Reflects Growth in User Base

There may be only about 300 installations currently using IBM's Virtual Machine Facility (VM/370) but that number is expected to expand substantially. And users are finding a growing range of support from independent software houses.

VM/370 is the control program that allows 370 users to run multiple jobs concurrently under DOS and OS or under the Conversational Monitor System (CMS) for time-sharing operations.

New York-based Standard Data Corp. has introduced VM/370 Isam, the OS-compatible Isam support for CMS under VM/370. And Rational/Software, Inc. (R/S) of Cambridge, Mass., has a library of command language extensions.

Isam support and language-involved sorts are not available under CMS as distributed by IBM, Standard noted. But the new Isam, coupled with the independent's recently announced sort for CMS [CW, May 15], makes the IBM monitor a more attractive system, the vendor said.

The Isam package can be acquired for $10,000 from Standard, at 1540 Broadway, New York, N.Y. 10036.

Extended Replacements

For its part, R/S has developed "greatly extended" replacements for the LISFT, TXTLIB and MACLIB commands, as well as a source archive maintenance command. A new DUMPF command is also in the R/S package.

The LF command, replacing LISTF, has an extended convention for file naming, supports sorting on "most output fields" and will write its output on-line, off-line or to an Exec file. This command also allows the user to specify extensions rather than replacements of an Exec File and to use a name other than CMS for that file.

The R/S-supplied NMACLIB and NTXTLIB commands allow the user to support larger systems than those possible with MACLIB and TXTLIB. Libraries under the new commands, however, are compatible with IBM language processor requirements.

R/S's NARCH command supports collection of multiple files into a single archive file whose internal directory records all the information needed to reconstruct each file with its original data.

All of these command processors and a Programming Tool Library for creation of other CMS command processors are available for "less than $3,000" from R/S at P.O. Box 26, MIT Branch Post Office, Cambridge, Mass. 02139.

Vendors Working Together To Link Adabas, Intercomm

RESTON, Va. – Software AG and Programming Methods, Inc. have announced cooperative efforts to completely interface the Adabas data base management system and the Intercomm teleprocessing system. A preliminary Adabas/Intercomm interface provided by Software AG is currently in operation by users.

An expanded interface, scheduled for availability in the fourth quarter, will include synchronized checkpointing by Adabas and Intercomm.

Intercomm is available from Programming Methods, 1301 Ave. of the Americas, New York, N.Y. 10019. Adabas is available from Software AG, 11800 Sunrise Valley Drive, here in Reston, 22091.

Info 74, Before & After

According to advance billing, Info 74 is a show that will "focus on the 'information system' as a significant new concept that management must learn to understand." It will include word processing systems, Telecommunications systems, microfilm systems, duplicating systems, and computer systems. That's a tall order for one show, and *Computerworld* will be covering it as only a newsweekly can.

Our Sept. 11th Preview Issue will be issued as the show opens in New York, and will include information on important sessions and exhibits and the important new products that will be on display.

In our Sept. 18th wrap-up issue, we'll take a look at what went on, how it went, and what it all adds up to. Plus, we'll cover WESCON, which will be wrapping up its week on the coast at the same time.

Whether or not you're going to Info 74 or WESCON, you'll want to read about them in *Computerworld* . And if you're an advertiser, you'll want to be sure that your ad is there when *Computerworld* covers these shows. For all the details just contact your *Computerworld* salesman, or call Judy Milford at (617) 965-5800.

	Issue Date	*Color, insert close*	*B & W close*
Info 74 Preview Issue	**Sept. 11th**	**Aug. 23**	**Aug. 30**
Info 74 and WESCON wrap-up Issue	**Sept. 18th**	**Aug. 30**	**Sept. 6**

COMPUTERWORLD

National Sales Office Neal Wilder, Dottie Travis, (617) 965-5800
Boston Bob Ziegel, Mike Burman, (617) 965-5800
New York Don Fagan, Frank Gallo, (201) 461-2575
Los Angeles Bob Byrne, Joseph Ryan, (213) 477-4208
San Francisco Bill Healey, Jerry Thompson, (415) 362-8547

The day Eastwest Mutual delivered Mr. Fliegel's Safe Driver Policy.

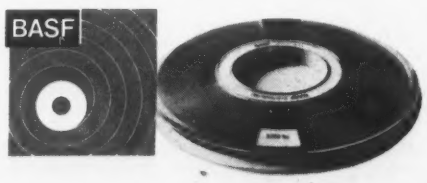
It could have been the programmer, or maybe it was Twinkie crumbs on the drive rollers. The fact remains, just one little computer error could bend your department's operation way out of shape.

What you need is a way to cut your probability of error. And the best time to start is the next time you order computer tape. Just specify BASF 2000/A.D.

We make 2000/A.D. a lot better than it has to be. Why? Take the tape edge for example. Look at most premium tape edges under a microscope, and you'll see the coating overhanging the base. These projecting coating edges tend to become detached by tape guides and drive rollers, and lodge on the tape's surface. The result: loss of head-to-tape contact... something you might never notice, until your next printout looks like alphabet soup.

Not so with 2000/A.D. Our special double-cut slitting technique keeps our tape edges perfectly symmetrical and debris-free.

One more edge. 2000/A.D. costs no more than other premium tapes. You're already paying for BASF quality... you might as well have it. For the complete 2000/A.D. story, write to BASF Systems, Crosby Drive, Bedford, Mass. 01730.



When it's BASF...you know it's not the tape that goofed

New Standards for savings on SYSTEM/3 CORE

Save on System/3 core cost with the new Standards — ECOM* replacement/expansion core from Standard Memories, Inc., the company that has been successfully installing 360-compatible core since 1971. From 8 kbytes up, we can expand any System/3 all the way to 64 kbytes in 8 kbyte increments. And we'll cut your core cost 20-40% in the process.

For operational purposes, our ECOM* 3 is completely transparent, thanks to an on-line/off-line switch which is standard equipment. Standard core is powered directly from the CPU; thus it requires no power supply, it powers up and down with the CPU, and it requires no additional line filters or power safety devices. Fault isolation is provided, permitting operators to readily locate any faults and notify appropriate maintenance personnel.

Service on the ECOM* 3? Standard has contract service representatives in more than 170 U.S. cities; you can't be very far from one.

ECOM* 3 is offered on purchase, lease or monthly rental plans. And you'll save money, no matter which plan you choose. If you have too little core, or if you're paying too much for the core you have, write for technical details on ECOM* 3 today!

STANDARD MEMORIES
INCORPORATED
AN APPLIED MAGNETICS COMPANY
2801 E. Oakland Park Blvd. Ft. Lauderdale, Florida 33306
TWX 510-955-9828 Telephone (305) 566-7611

Raw Count of Instruction/Day May Reward Poor, Not Good Code

By William A. Delaney
Special to Computerworld

One standardized method for judging programmer performance, making schedules and estimating costs that is in common use today may give a slanted view of real productivity.

This method is based on "checked out instruction/day." One or more very senior analysts looks over the work to be done and makes estimates of the number of coded instructions required for each phase or program required for the proposed project.

All other scheules, costs and manpower requirements are based on these estimates. This is a good thing to do and I'm not in any way questioning this method. It is necessary and certainly better than nothing.

And this method does have one thing going for it: everyone accepts it almost without question. Here lies the danger and perhaps the seeds for errors, misunderstanding and future problems.

In day-to-day use, the law comes down to this: the more instructions a programmer turns out, the better he or she is. This may not be true at all – in fact, the exact opposite may be true.

A situation may come up in which available space in core may be extremely limited. Therefore, the fewer instructions used, the better. In this case, much study and maybe even trial and error is necessary to do the job in, for example, 50 locations, when it could have been done quickly and effortlessly in 100 to 150 locations.

Also, if in a real-time environment a job must be executed every one-tenth of a second, then this timing requirement takes priority over number of instruction/day.

No one can judge how anyone else really thinks; however, it is not too difficult to imagine the following situation:

A bright person is working as a programmer and it suddenly dawns upon him that the managers are judging his performance mainly on how man coded instructions he generates per day or per project. In such a situation it is easy to conclude that he might develop programs of the largest size possible in the shortest period of time in order to impress his superiors with his efficiency and productivity.

Viewpoint

And why not? This is how he is being trained to work.

Sloppy or wasteful programming techniques are often unknowingly rewarded by upper management. Efficient techniques that require more thought, effort and time are often viewed as below-average performance.

Using instruction counts as a measure, however, we can easily fall into believing that the worst programmers are the best – because they work so hard at it.

A case in point was a programmer who worked 14 hours a day, seven days a week, for eight weeks to get a small program running in a new installation. For his efforts, his company gave him an award for exceptional service.

Shortly thereafter, another programmer (for the first had been promoted to a management position as an additional reward) was given the job of making some additions to this program. He found that the program was such a confusing mess

(Continued on Page 17)

DCD ANOTHER IDEA FROM GEORGE & CHARLIE

DCD...the only roadmap to faster, easier program debugging and maintenance

Ever get lost trying to wade through a ream of listings when you were debugging a program?

Worse yet, have you ever tried to understand the data flow of a program you weren't familiar with?

It's like trying to find your way around a new town without good directions...you get lost!

DCD (Data Correlation and Documentation System) is a totally new COBOL documentation system that guides you quickly, easily and safely through a program—new or old.

Think of it as a roadmap.

It's a clean, straightforward, easy-to-follow path that guides you from input, through working storage, to output and back again.

DCD gives you data flow, logic flow documentation and source listings, all on a single, compact report.

With DCD you can debug faster because all of the information is right in front of you. You quickly locate the problem and creatively solve it.

And you produce a high quality new program in a shorter time span with a minimum of headaches.

For program maintenance, DCD is a must. It eliminates all source listing and reduces desk checking time. It also reduces time-consuming and expensive recompiles.

If debugging and program maintenance are keeping you from doing more programming projects, find out how the programmer's roadmap can help.

THE PERFORMANCE PEOPLE
GEORGE CHARLIE
Boole & Babbage

850 Stewart Drive, Sunnyvale, California 94086
(408) 735-9550

I run in a fast crowd and need to find my way around debugging and program maintenance quickly. Send me more information on DCD . . . the programmer's roadmap. Available for OS and DOS IBM 360/370.

Name.....Title.....
Company.....
Street.....City.....
State.....Zip.....Phone.....

School Days

Following are some of the public seminars and workshops that have been scheduled during the next month and a half. When two prices are shown, the first is for members of the sponsoring organization, the second for nonmembers.

Sept. 9-10 – **Structured Programming: Management Overview**; New York*; $275; Brandon Applied Systems, 1611 N. Kent St., Arlington, Va. 22209.

Sept. 9-11 – **Developing Computer Systems for Accounts Payable**; Chicago*; $330/$380; American Management Associations (AMA); 135 W. 50th St., New York, N.Y. 10020.

Sept. 9-11 – **Project Management**; Boston*; $375 Ware Associates (Ware), 38 Main St., Hudson, Mass. 01749.

Sept. 9-13 – **EDP Audit and Control III – Audit Techniques**; New York*; $475/$510; Institute of Internal Auditors, Inc. (IIA), 5500 Diplomat Circle, Orlando, Fla. 32810.

Sept. 11-13 – **Structured Programming Workshop**; New York*; $385; Brandon.

Sept. 11-13 – **Developing EDP Systems for General Ledger and Financial Statement Preparation**; Chicago; $330/$380; AMA.

Sept. 11-13 – **Model Fitting and Optimization by Computer**; Washington, D.C.; $395; Institute for Advanced Technology (IAT), 6003 Executive Blvd., Rockville, Md. 20852.

Sept. 12-13 – **Nonparametric Statistics**; Washington, D.C.*; $295; IAT.

Sept. 16-18 – **EDP Operations – Advanced Practices and Procedures**; Washington, D.C.; $395; IAT.

Sept. 16-18 – **Structured Programming Design Workshop**; New York*; $385; Brandon.

Sept. 16-18 – **How to Develop DP Standards (Workshop)**; New York*; $385; Brandon.

Sept. 16-20 – **Digital Logic Servicing Techniques**; Philadelphia; $285; Technical Training Center, Leeds & Northrup Co., North Wales, Pa. 19454.

Sept.16-20 – **CICS/VS Logic and Debugging**; Toronto*; $350; On-Line Software International (OSI), 411 Hackensack Ave., Hackensack, N.J. 07601.

Sept. 18-20 – **ANS Cobol Efficiency Techniques**; New York*; $385; Brandon.

Sept. 18-20 – **Computer-Based Trade Accounts Receivable and Credit Management Systems**; New York*; $330/$380; AMA.

Sept. 18-20 – **Designing On-Line Computer Systems**; Los Angeles*; $375; Yourdon, Inc.; 575 Madison Ave., New York, N.Y. 10022.

Sept. 18-20 – **Management of Information System Planning**; Washington, D.C.*; $395; IAT.

Sept. 19-20 – **On-Line Operations Management**; Washington, D.C.*; $295; IAT.

Sept. 23-24 – **Management View of the Data Base Commitment**; Washington, D.C.*; $275; Performance Development Corp. (PDC), 32 Scotch Road, Trenton, N.J. 08628.

Sept. 23-24 – **Technical Reports**; Washington, D.C.*; $295; IAT.

Sept. 23-24 – **Testing, Debugging and Maintenance**; Chicago*; $250; Yourdon.

Sept. 23-25 – **Structured Design**; New York*; $375; Yourdon.

Sept. 23-25 – **Management Development by and for Women**; Washington, D.C.*; $395; IAT.

Sept. 23-27 – **Applied Interactive Computer Graphics**; Los Angeles; $345; UCLA Extension, Dept. K, P.O. Box 24901, Los Angeles, Calif. 90024.

Sept. 24-26 – **Management of System Maintenance**; New York*; $385; Brandon.

Sept. 25-26 – **Data Base Project Planning and Cost/Benefit Analysis**; Washington, D.C.*; $275; PDC.

Sept. 25-27 – **Contracting for Computers and EDP Support Services**; San Francisco*; $295; Computerworld EDP Seminars (CW), 797 Washington St., Newton, Mass. 02160.

Sept. 26-27 – **Operations/Automation Regional Workshop**; Atlanta*; $100/$110; Operations/Automation Division, American Bankers Association. 1120 Connecticut Ave., Washington, D.C 20036.

Sept. 30-Oct. 1 – **Data Base Package Evaluation and Selection**; Atlanta*; $275; PDC.

*Also scheduled for other cities later.

Instruction Count Rewards Poor Code

(Continued from Page 16)

that it was easier to rewrite it than to try and modify it.

The rewriting and debugging took exactly one week, working normal hours. Even considering that writing a program for the second time is far easier than writing it the first, the difference is significant. Moreover, the new program ran eight times faster than the old, took half the storage and was half as many lines of coding.

The first programmer clearly had been rewarded for making a mountain out of a molehill. The discovery of this misapplication of management largesse led to a severe drop in morale in this programming group.

There are very few organizations in which supervisors can go into enough coding detail in evaluating programmers. So the situations described are highly likely to occur. I have heard of it and seen it happen, but I cannot say if it is widspread – but I'd bet that it is.

I am not advocating the abolition of the system of "instruction/day" because it is the only one we have available today in general use. However, I suggest that other methods be developed to accompany and improve upon what we now use.

William Delaney is president of Analysis & Computer Systems, Inc., Burlington, Mass.

PRODUCT AND MARKET PLANNING

—

EDP BUSINESS STRATEGY

AUERBACH
ASSOCIATES, INC.

PHILADELPHIA • NEW YORK
WASHINGTON • LONDON
(215) 491-8200

Hard Times with Hardware?

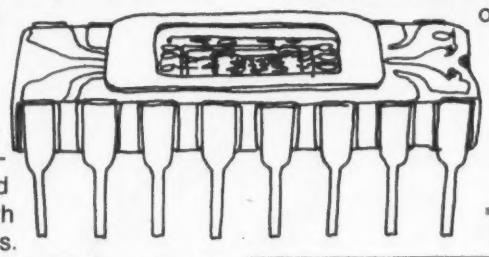
Sometimes the most difficult interface is not in your system at all. It's between the programmer and the hardware designer.

The reason is simple. Neither of you speak the same language when it comes to computers.

Microcomputer Technique will help you bridge that communications gap. We're offering an intensive two-day seminar that will give you a good understanding of hardware, with an emphasis on microprocessors.

We'll teach you the fundamentals of computer architecture and digital system design, down to the circuit level. When we're finished, you won't be an engineer, but you'll be able to communicate effectively with designers.

We also offer a full range of other seminars covering the evaluation and selection of microprocessors and microcomputers, system design with microprocessors, and the hardware and software of specific microprocessors.



Programmer's Introduction To Hardware

Montreal Sept. 5-6	**New Orleans** Oct. 3-4
Philadelphia Nov. 7-8	**Boston** Dec. 2-3

Enrollment in all seminars is limited. To register, or to receive complete details on any of our courses, call or write:

Microcomputer Technique, Inc.

11227 Handlebar Road
Reston, Virginia 22091
(703) 620-9676

OMEGA 80

An investment in the future.

It took foresight to put the development and perfection of a product like Omega 80 ahead of costs.

Because in the long run, costs are always nominal when a product meets a growing need. That's the case with Omega 80. It's designed for high-speed, high-density digital recording.

Its recording/reproduction range is from 25,000 FRPI to as high as 80,000 FRPI.

The materials and technology used to produce this new medium are so advanced, it will be years before Omega 80's potential is even challenged.

But with a life expectancy of up to 100 years, an investment in Omega 80 is a solid investment in the future.

Omega 80. $30 per reel.

GRAHAM MAGNETICS
Graham, Texas 76046

COMMUNICATIONS

Store-and-Forward Switch

Single Front-End Supports Variety of Terminals, Lines

By Ronald A. Frank
Of the CW Staff

RICHMOND, Va. – A telecommunications manager for a multidivisional company with a series of terminal systems interconnected to the main DP site can take two basic network configuration approaches.

Either the network can standardize on a small number of terminals and eliminate all others, or the central site can adapt its capabilities to service the variety of terminals already installed.

At Reynolds Aluminum, Terry Martin, manager of telecommunications systems, elected to go the second route – with some surprising results.

The company supports ten different types of terminals, some of which are different models of the same basic teletypewriter. Nevertheless, the entire terminal mix reports into one front-end configuration that has amazing flexibility for handling both high- and low-speed lines.

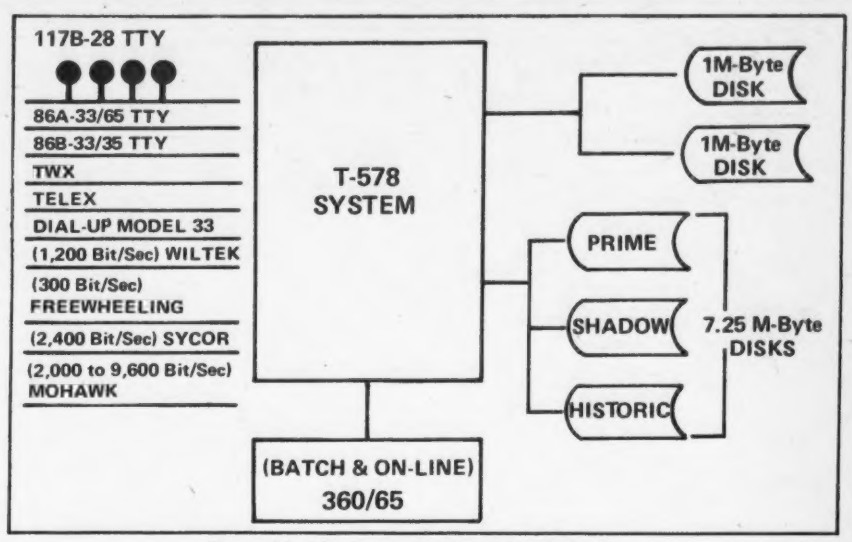
The front end is actually a store-and-forward switch, according to Martin. The unit operates off-line from the company's dual 360/65s, which do the main processing for the five separate operating arms that have their DP work done at the central site here.

The switch is a Wells T0578 which was originally provided by Wells TP Sciences, now Graphic Scanning. The unit is divided into two logical sections, the first of which includes dual multiplexers, and the second of which is an IBM 1130 with 48K of non-IBM storage.

While it may be unusual to have an IBM CPU built into the switch, Martin sees some definite benefits. The 1130 has 48K of independent core from Computer Hardware, Inc., but there is 4K of native core which is enough for IBM to maintain the CPU, he pointed out.

The processor is interfaced with dual 64-line multiplexers although one is actually reserved for back-up. About 58 of the available 64 lines are now being used by a terminal mix that is mostly low speed.

The equipment ranges all the way from Model 28 TTYs operating on a Western Union private-line system to Mohawk binary synchronous terminals which transmit at 9,600 bit/sec. In between are various models of teletypewriters including both Model 33s and 35s on both dial-up and private lines.



Reynolds Aluminum Terminal Configuration

In addition, Reynolds is using 90 buffered dial-up Wiltek terminals operating at 1,200 bit/sec, and Sycor terminals in an order entry application are transmitting data at 2,000 bit/sec with Bell 201 modems. Also being evaluated are GE 30 char./sec Terminet terminals.

Data Exchanged

While the goal so far has not been to put the terminals on-line to the CPU, Martin has managed to allow each of the terminals to exchange data with any other terminal in the system via the Wells T-578. The switch is handling about 20,000 messages daily; about 40% of those contain administrative information, another 40% is order entry data on the Sycor terminals and the rest of the messages contain such information as payroll data, corporate reports, etc.

A batch transfer capability to the twin 65s is available if data is transmitted through the Mohawk units, and eventually all terminals will handle on-line inquiries to the mainframes, Martin said. The system currently includes about 200 terminals each of which communicates using a standard message header. According to Martin, few messages are "misrouted and lost messages are practically nonexistent." Operational uptime is running about 99%, he said, but he is shooting for 99.5%.

Much of the data base accessed by the terminals is stored on a 7.25M-char. 2311 IBM disk system which is interfaced to the 1130. This is enough capacity to store about a week's traffic in case any problems arise, Martin explained.

Much of the dial-up equipment runs on Wats lines and some, like the Model 33 TTY application, are acoustically coupled when sending messages into the switch.

Asked if the wide variety of equipment has ever caused maintenance problems, Martin said there were no problems. He said a staff of one supervisor and three operators oversees the communications network, and much of the time these staffers just monitor the equipment.

When one studies the size of the nationwide network with 200 terminals on a wide variety of carrier facilities, one concludes that Martin may be oversimplifying what it takes to keep his system operating.

Asynchronous Data Set Emulates Bell Units in Point-to-Point Net

EL SEGUNDO, Calif. – An asynchronous data set that can be used in local, point-to-point networks or to emulate private-line data sets has been introduced by Computer Transmission Corp.

Called the Directran, the data set is an inexpensive alternative to (and an emulator of) Bell 103/113 data sets, acoustic couplers or Bell 202C/202D data transmission devices in point-to-point networks that serve local asynchronous terminals up to 22 miles from a central site.

Directran is used to connect terminals at or near a computer site to a front-end processor, and it serves as a local distribution element for remote communications nodes by connecting terminals to multiplexers, concentrators or packed-switched network nodes.

The device can interface directly with terminals including teletypewriters, CRTs, graphics terminals, printers and data acquisition systems, the firm said.

The unit operates at any asynchronous data rate up to 2,400 bit/sec over four-wire twisted pair lines, without transformers, amplifiers or loading coils, and handles local distribution of asynchronous data in either dedicated or direct dial communications protocol. It simulates all of the standard "hand-shaking" sequences to emulate terminal operation over private lines, eliminating the need for costly auto-answer modems and switched network service, the company said. It can also emulate a private-line data set, such as the Bell 103F or 202D-type data sets.

Built-in capabilities include both local and remote loop test circuits. Stand-alone, desk-top or plug-in printed logic module versions are available.

The stand-alone Model M611 is priced at $370. The plug-in Model 631 data set, which has two Directrans on a single board, is priced at $500.

The housing for the Model 631, which includes chassis, power supply and cabinet, is priced at $850. Delivery is from 2352 Utah Ave., 90245.

RJE Software Allows DG Nova to Emulate CDC UT200 Terminals

PALO ALTO, Calif. – Gamma Technology is offering remote job entry (RJE) software that allows a Data General Nova computer to emulate a Control Data UT200 RJE terminal.

The UT200 terminal program runs under either of Data General's real-time operating systems (RTOS or TDOS) and may be used with cassettes, magnetic tape, disk, cards or paper tape.

The minimum hardware required to run the program consists of any Nova computer with at least 8K of memory, real-time clock, a control console, line printer, input device and synchronous controller. If a disk-based system is being used, the UT200 program can run in the foreground partition while assembly, editing or batch processing is running in the background. The use of magnetic tape or disk file input eliminates many of the problems associated with card reader operations, a spokesman noted.

In order to obtain the object program on paper tape or magnetic tape, a customer must sign a licensing agreement and pay a one-time license fee of $1,000.

The source code costs $250 additional from the firm at Suite 322, 800 Welch Road, 94304.

TP Monitor Separates Student, Administrative Data

By Patrick Ward
Of the CW Staff

ERIE, Ohio – A common problem for small colleges is how best to divide available computer power between instructional and administrative tasks.

Lorain County Community College here, for example, wanted to run on-line file maintenance and other applications on its 128K IBM 360/40 under DOS, but the first priority was to leave a 56K background partition for student use.

Therefore, the teleprocessing monitor the school chose to handle its on-line CRTs had to fit within the 56K foreground partition, observed Eugene E. Newton, the college's DP director.

The school chose Westinghouse's Teleprocessing Interface System, a package that serves IBM 360/370 DOS users, after it tried IBM's Customer Information Control System (CICS)/DOS Entry and found it occupied 78K in the 360/40, Newton said.

The college had been pleased with its Westinghouse Dump/Restore/Copy program, and so decided to try the company's Teleprocessing Interface System, Newton mentioned.

Westinghouse sent the software on tape and a manual on a trial basis, Newton said. Within two days, Newton and systems analyst Dave Coy had the monitor up and a vendor name and address file running in an accounts payable application.

The monitor itself occupies 12K to 14K, about 35K is available for application programs and an 11K to 12K free core pool is left over for teleprocessing, Newton said.

The college now has six IBM 3270 CRTs and two IBM 3286 printers. The terminals and IBM 3272 controller are installed from 20 feet to 400 feet from the mainframe. The CRTs are connected by coaxial cable, and the IBM 3272 control unit plugs directly into one of the 360/40's two selector channels, Newton mentioned.

Normal response times are now under a second, except when opening a file, Newton said, adding that he is interested to see what response times he gets in the fall, when there will likely be two more CRTs and two printers all in use at once.

"We did recognize that the CICS is more sophisticated than the Westinghouse, no question about it," Newton mentioned in explaining his software choice.

For example, he said, the Westinghouse package leaves the applications programmer with more responsibilities for terminal priorities, security and logging functions than CICS does. The Westinghouse package also supports only IBM 3270, 2260 and 1053 terminals and their equivalents – not as broad a range of devices as CICS supports, Newton noted.

The college is now using its CRTs to do most of its file maintenance at the same time students use the background partition for their programs, Newton said. By adding applications modularly over the months, he also hopes to have an on-line registration process by next summer.

The Westinghouse package has a cost advantage over CICS/DOS Entry version, Newton said. The Westinghouse package costs about $4,000 on a lease/purchase plan, while the CICS user would pay $240/mo as long as he had the package.

The 840 out of Southboro is now scheduled to arrive in 45 days.

When the 840 first came out, a lot of people came running to Southboro to see what it could do.

It did so many different things that people started buying them faster than we were building them.

Which unfortunately made them kind of hard to get.

So in an effort to make 840's easier to come by, we've made the place where we make them bigger. And faster.

And to encourage even more people to want 840's, we're offering some incredibly powerful systems software. A Real-time Disc Operating System that works just as hard developing your programs as running them. Plus a Fortran 5 compiler so comprehensive the diagnostics tell you exactly what's wrong and where. In English.

To run software like that, you'll get hardware like this: 256K bytes of core, Memory Management and Protection Unit, high-speed Floating Point, terminal, disc and tape drive.

But now you won't have to stand in line to get it.

Catch the 840 out of Southboro.
It'll arrive 45 days after you buy your ticket.

Data General

The computer company you can understand.

Data General Corporation, Southboro, Massachusetts 01772, (617) 485-9100.
Datagen of Canada Ltd., Hull, Quebec (819) 770-2030/Data General Europe, Paris, France 504-23-44.

With On-Line Order Entry System

Britain's 'Bangers' Get Their Bulbs in Six Hours

BIRMINGHAM, England – Many of England's venerable "bangers" – used cars – get necessary replacement parts in a very modern way.

Joseph Lucas Sales & Service Ltd., the replacement-parts arm of one of Britain's biggest automative electrical equipment maker, has 18 of its regional supply centers tied into the company's headquarters and central warehouse through an on-line order entry system.

Parts manufactured in the Lucas factories are supplied in bulk to a highly-automated central warehouse at Fradley, about 22 miles north of Birmingham. The warehouse stocks about 17,500 different parts, handles 6,000 order lines daily and receives about 500 shipments from the factories daily to replenish stock. The first line of the distribution channel for Lucas' products consists of 18 Lucas Sales & Service centers located in the major cities of Great Britain, Northern Ireland and the Irish Republic. These centers carry a wide range of parts such as spark plugs, distributors, bulbs and lenses.

The main function of the service centers is to provide stock and technical and selling support to 350 wholesaling outlets. These outlets replenish their stock from the service centers but can also send certain orders directly to the Lucas head office in Birmingham if the service center is out of stock.

Since 1971

The real-time order entry system began on an experimental basis using only the Liverpool service center tied into the head office and the warehouse. Two 48K-word Univac 418 III computers were installed in 1971. Terminals in the warehouse, head office and all of the service centers gradually were linked by telephone lines to the central processors.

Peripheral equipment includes four high-speed drums (two FH-432 and two FH-1782 models), two Fastrand II mass storage units, six Uniservo 6C magnetic tape units and a Univac 9300 computer with card reader, punch and printer.

The terminals are teletypewriters (Creed Envoy Dataprinters) which can be used for input or output functions. They operate at 110 bit/sec but are used at 85 bit/sec (7 char./sec).

A total of 107 terminals is now on-line to the computer with each service center having three to eight machines depending on the volume of business transacted. The head office has nine and the warehouse 15.

Terminal Input Forms

In a typical operation such as a credit order being handled from the sales counter at a service center, the terminal operator will type details of the order on a terminal input form.

The first information entered is the transaction code number which tells the type of transaction (credit of cash, stock enquiry, etc.) for any one of 14 different transactions (incorporating 123 transactions codes); the computer then checks the code for validity. After the operator enters the customer's account number, the computer accesses the customer file, checks the validity of the account number and picks up customer details.

The operator enters the customer's order number and any other references which are accepted by the computer. Following this, the operator keys in the part number and quantity.

At this point, the computer accesses the parts file, checks the correctness of the part number and the stock availability and picks up other details of the part ordered. The terminal repeats the part number and quantity, types the bin number, description of the part and stock balance.

The operator then enters any special instructions and transmits the completion of message symbol. With receipt of this signal, the computer updates the stock balance, records transactions on a daily file and transmits an "advice" note number to the terminal, which is printed on the form and informs the operator that the order will be completed.

The actual advice note is printed on another terminal in one of the service center stores. The storekeeper takes the advice note, picks the part from the bin and delivers it to the sales counter.

If the service center is out of stock for the part in question, the order is either held at the service center or reentered and processed as if the order originated at the head office, since the advice note will be automatically routed to the central warehouse for printing on a terminal there and then shipped directly to the customer.

At the end of each day, the file of transactions built up by the computer is used for four purposes – to produce a multiline invoice for all goods issued to each customer, to update the stock ledger, to issue instructions to replenish all parts where stock has fallen below predetermined levels and to update various analyses.

At the Lucas head office the computer sorts the orders into the picking order locations in the warehouse. This procedure was designed to preserve a high level of productivity by ensuring that none of the 17,500 bins are entered more than four to five times daily.

The actual time consumed in handling an average order from receipt to shipment at the warehouse is about six hours. Currently, the system is handling about 25,000 transactions daily, but by increasing file sizes it has the capacity to handle 30,000.

Lucas feels that the real-time computer system has resulted in a number of benefits. Among the most important are provision for better and faster customer service, lower distribution costs and the savings resulting from the elimination of many paperwork operations including card punching, stock ledger maintenance, stock reordering and error correction.

WELCOME TO WESCON!

September 10-13
Los Angeles Convention Center

The nation's largest and most complete electronics show and convention this year opens in Los Angeles on September 10. And of course, you're invited.

This 23rd annual Wescon is a super week in an exceptional electronics year. There are 54,000 net square feet of product demonstrations by 300 electronics producers – that's a full house, literally.

The 540 exhibits are grouped in four product/system categories on one beautiful carpeted and air-conditioned floor of the Los Angeles Convention Center, and will be open for hands-on demonstrations for four days and one evening.

The four-day **professional program** is an escalator ride away – also in very large, carpeted and air-conditioned auditoriums. This 28-session program is both current and choice. Four knowledgeable sessions on microprocessors; a full day on CCD applications; an expert update on medical electronics; a first-rate panel on uninterruptable power problems; sessions on component and board testing, plastic encapsulated circuits, management in periods of crisis, and taking high-technology products from lab to market.

And there's more – a keynote address by **Donn Williams,** president of Rockwell Electronics Operations, a Distributor-Manufacturer-Representative conference, an all-industry reception, and three California-colorful social events for visiting wives.

Your share of **four idea-filled days** awaits you in Los Angeles. Registration for all four days of the program and show is just $5, payable at the door. And if you'll assist us in a simple questionnaire-survey at the show, you'll be eligible for a very special prize drawing. On each of Wescon's four days, a drawing winner will receive an HP-45 hand-held calculator!

Better **plan right now** to join us in Los Angeles. Write directly to the Wescon Housing Bureau, P.O. Box 3669, Los Angeles, CA 90054, for accommodations. We're holding large blocks of rooms at the Regency Hyatt House, Los Angeles Hilton, Biltmore, Sheraton-West and Wilshire-Hyatt.

WESCON74

Western Electronic Show and Convention, 3600 Wilshire Blvd., Los Angeles, Ca 90010 (213) 381-2871

Sponsors: IEEE Los Angeles Council and San Francisco Section; Electronic Representatives Association (Southern and Northern California chapters).

Termiflex Has Couper/Case

NASHUA, N.H. – Termiflex Corp. has introduced an acoustic coupler/carrying case for its hand-held, teletypewriter-compatible terminal.

The coupler allows the terminal to transmit at 10-, 15- or 30 char./sec over phone lines. Total weight of the acoustic coupler/carrying case, with terminal, is five pounds, according to Termiflex.

The acoustic coupler/carrying case costs $480, with a power supply available for $160 from the firm at P.O. Box 1123, 17 Airport Road, 03060.

"Black Watch" waits for the challenge to guard.

"Black Watch" tape has a special-textured back side which guards against cinching, shifting and scratching. You get this "Scotch" 700 tape from the people who developed the first computer tape in 1953. People who will go to any length to solve a customer's problem. People who thrive on assisting. The Data Recording Products Division of 3M. A proud clan.

Call out the clan.

"Scotch" and "Black Watch" are registered trademarks of 3M Co.

3M COMPANY

BLIPOUTS
BROWNOUTS
BLACKOUTS
ENERGY CRISIS
POWER PANGS?
Cyberex Uninterruptible Power Systems provide continuous computer grade power regardless of line problems. Cyberex originated and has 5 years field experience with 4th generation UPS systems – up to 1,000 Kva and self-contained units for minicomputers.
Ask for Cyberex's free power pang survey on your computer.
CYBEREX INC.
Willoughby, Ohio 44094 • (216) 946-1784

Azur Recorders Transmit in Four Codes

RICHLAND, Wash. – Azur Data Corp. has introduced two hand-held data recorders, different versions of which can transmit in Ascii, Ebcdic, Baudot and BCD codes.

The Infopac I has a 4,000-character memory capacity and an eight-character unit record with up to three digits of memory record for identification. Infopac II's memory runs from 4,000 to 32,000 characters, with a 32-character unit record and memory identification.

Both devices can hold up to 15 characters in their displays, including a four-character line identification.

Transmission from 10- to 120 char./sec is through an auxiliary device that includes an acoustic coupler and battery charger.

Both Infopac models weigh about three pounds with batteries, the firm stated.

Infopac II can receive as well as send, and the unit can be programmed with fixed numbers, an Azur spokesman noted.

A meter reader, for example, can receive fixed customer numbers over a telephone and then enter variable data next to the fixed numbers as he goes from house to house.

A battery pack provides for eight-hour operation. An auxiliary battery contains enough standby current to retain memory when the main battery pack is replaced in the field.

The first Infopac units have already been delivered to the Weyerhaeuser Co., the spokesman noted.

Infopac I costs about $1,500 and Infopac II about $3,000 with delivery in 30 days from the firm at 1305 Mansfield, 99352.

Data Briefs

Nova Interface Handles Eight Serial I/O Ports

SEATTLE, Wash. – A multiport communications programmable interface for Data General Nova computers is available from Metrodata Corp.

Featuring eight serial I/O ports, the MCPI-1 interface allows up to eight data terminals or computers of varying transmission rates or code structures to communicate directly with a common mini. With a wide speed selection capability, transmit and receive rates are individually software programmable from 6- to 12,800 bit/sec. Compatible with an RS 232-type modem, the interface features send-and-receive unattended operation.

The flexible interface allows a single Nova to interact with terminals of different speeds and code structures.

Contained on a single Nova-style PC card, the interface uses the existing Nova power supply. The price is $3,300 with delivery in 60 days from 1250 Mercer St., 98109.

Omnitec Puts Out 1,200 Bit/Sec Coupler

PHOENIX – Omnitec has come out with its first 1,200 bit/sec acoustic coupler.

The Model 1200A is specifically designed to interface with Bell's 202C reverse channel modem over the switched network, the firm stated. The unit can be used in either the acoustic mode where portability is needed or with a data access arrangement in permanent installations, the firm said.

The 1200A operates in normal and automatic line protocol modes. In the normal mode, control signals form the remote side establish line control.

In the switch-selectable automatic mode, the unit's own intelligence establishes line control.

The model 1200A costs $975 with delivery in 60 days from the firm at 2405 South 20th St., 85034.

This unique seminar on Data Communications covers things that weren't even heard of a year ago.

Data Communications isn't just a complicated subject. It's a rapidly changing one. And our Data Communications seminar keeps on top of these changes like nothing else. We even provide you with free update materials for a full year after you complete the course.

Here are just some of the recent changes you'll learn about
- Synchronous Data Line Control (SDLC) - the principles of IBM's newly announced protocol and its implications to users
- HiD-LoD – Bell's newly effective tariff for voice lines.
- DDS- Bell's new all-digital data network--principles of operation and prices
- Newly approved major revisions to WATS
- Impact of Satellite Carriers and Specialized Carriers
- Value-added Carriers

We'll cover the field
Course topics include not only these recent changes, but a series of well-selected topics that will tell you how to go about effective data communications planning and implementation, including topics like:
- Intelligent terminals- performance and selection criteria
- Network software handlers- like CICS, Environs I, IMS and others
- Network organization and design. . . and much more.

You'll also learn how to save money
This course also includes a look at money-saving techniques, using such innovative concepts as:
- Split-stream modems
- Diagnostics for fault isolation
- Modem-sharing devices and digital bridges
- Remote multiplexers/concentrators
- Front-end prepocessors

Free reference materials and continuing updates
All participants in the seminar will keep the seminar workbook–a 2-volume loose-leaf outline of all course materials prepared by ICC Institute. You'll also receive a copy of "Data Modems Selection and Evaluation Guide" by Vess V. Vilips, and a "Data Communications and Teleprocessing Dictionary." *PLUS* you'll get free update materials for one year--just to keep you ahead of tomorrow's changes.

Dr. Dixon Doll leads Seminar
Dr. Dixon Doll, the highly respected teleprocessing consultant, leads the expert faculty at this seminar. Dr. Doll has his PhD in Systems Engineering from The University of Michigan, and many years of experience in this field as a consultant and educator. He has taught graduate level computer systems design, and has served as a professional consultant to such firms as IBM, Raytheon, ICC and MCI. Dr. Doll takes an active part in the entire seminar.

You should attend this seminar, if:
- You are currently involved in data communications on a management or operational level and wish to expand your knowledge of the field.
- Your company will be going into this field in the near future.

Charges and Enrollment
The total cost for this two-day seminar is $350, including workbook, reference materials, year-long update service, luncheons and continental breakfasts. This does not include hotel rooms, if necessary.

To enroll, look over the schedule below, fill out the coupon and send it in. Remember, enrollment must be limited, so don't wait until it's too late.

Data Communications, the Executive Imperative
Course materials and outline prepared by the ICC Institute

THE EDP SEMINAR SERIES
Sponsored by COMPUTERWORLD

To: **Ed Bride**
Vice President Editorial Services
Computerworld
797 Washington Street
Newton, Mass. 02160

( ) **Reserve _____ place(s) at your Data Communications Seminar for the city and date(s) checked and send a copy of your descriptive brochure.**
( ) **Check enclosed ($350 first person, $300 each for additional people)**
( ) **Purchase order enclosed**
( ) **I cannot make reservation at this time, but please send brochure and registration form**
( ) **I am interested in having seminar given at my company for special group rate. Please send details.**

( ) **San Diego Sept. 30-Oct. 1** ( ) **Washington, D.C. Oct. 7-8**
( ) **New York Oct. 14-15** ( ) **Chicago Nov. 4-5** ( ) **Miami Dec. 2-3**

Name _____
Title _____ **Company** _____
Address _____
City _____ **State** _____ **Zip** _____
Telephone ( ) _____

Don't you wish someone made a 3270 with features like these?

- ☐ Programmable, when you need it.
- ☐ Up to 32 operator positions, each with printer, when you need them.
- ☐ Double the transmission rates, when you need it.
- ☐ Up to 32K bytes of main memory, when you need it.
- ☐ Twice the printer speed per station, when you need it.
- ☐ Built-in communications control, when you need it.
- ☐ At 25-50 per cent less cost. You need it.

Incoterm makes two.

They are part of a family of intelligent terminals that blanket 3270 user needs.

One member is called the SPD® 320. It does just about everything a 3270 can do, plus a few extras, for less than half the price. Think of it as a two-for-the-price-of-one alternative.

But 3270 users often want to do more at their terminal site. Like special programming and formatting, local data storage, remote batch processing, even line monitoring. So the SPD family can expand far beyond the capabilities of a 3270 – up to our SPD 20/20.

With an SPD 20/20, you can add main memory – up to 32K bytes. Add tape, disk or card peripherals – up to 16 per system. Add printers – 165 cps per operator, plus line printers. Add communications speeds – up to 9,600 baud. Add multiplexing. Add Incoterm's software support – from DOS systems to custom applications.

Add fast field service – from any of our 36 domestic offices. Then add up the price – and you are still about 25 percent below a 3270.

Incoterm: More power to your terminal.

INCOTERM® CORPORATION

6 Strathmore Road
Natick, Massachusetts 01760
(617) 655-6100

THE BEST COMPETITOR THE 2314 EVER HAD.

For every EDP manager who still needs 2314-type equipment, the Memorex 3660 is a better choice in disc storage systems.

The 3660 is fully compatible with the 2314, yet its performance surpasses that of the 2314 file system in every way. And it has the superior reliability and maintainability of Memorex head and drive technology. It is *the independent* system that has set the pace in throughput and economy since 1969.

More than 10,000 3660 drives are in operation, worldwide. The 3660 has logged more than 90,000,000 system operating hours on IBM 360/370 and other computers that use 2314-type storage systems.

And we offer responsive delivery, flexible terms and the backing of Memorex's international field engineering organization—the largest and most experienced of the independent storage system service groups. We have 124 Memorex sales and service offices throughout the world.

So there never was a better time to get a 3660, the best competitor the 2314 has ever had. Whether you need more 3660 capacity or whether you need the advantages of switching to an independent system, call your nearby Memorex representative.

Memorex Corporation, San Tomas at Central Expressway, Santa Clara, California 95052, and all major cities.

MEMOREX

Mini World

Cassette Drive Designed For Program Loading

ROCHESTER, N.Y. – Sykes Datatronics tape cassette drive system is designed for program loading and sequential data logging for a variety of minicomputers.

The Model 80 has a transfer rate of 9,600 bit/sec, rewind speed of 120 in./sec and a capacity of more than 30 4K programs per 2.8M-byte cassette.

Interfaces and osftware drivers are available for DEC PDP-8s and PDP-11s, Data General Novas, Digital Computer Controls minis, Varian 620s and 73s, Hewlett-Packard 2100s, Micro 810s and CIP 2100s.

The drive is priced at $2,195 from the firm at 375 Orchard St., l4606.

Diablo and Qume Printers Interfaced to CA Minis

MOUNTAIN VIEW, Calif. – The Model CPC 100 character printer controller from Minicomputer Technology interfaces the Computer Automation Alpha 16, LSI-1 and LSI-2 minicomputers to either the Diablo 1200 Hytype or Qume Q30 and Q45 character printers.

The controller provides a capability for proportional spacing, two-color ribbon and incremental plotting, the firm said.

Priced at $450, the controller is also available with a keyboard input option. The firm is at 1901 Old Middlefiled Way, 94043.

1 kVA Uninterruptible Supply Available from Topaz

SAN DIEGO, Calif. – The 3152 uninterruptible power supply from Topaz Electronics will provide 1 kVA of power for small computer users.

Each unit is packaged complete with battery charger, inverter and internal batteries that will provide full load backup for 20 minutes. External batteries may be connected in parallel with the internal batteries to increase the backup time, the firm noted.

DEC 340 Forms Center Of Mini Application System

WHITE PLAINS, N.Y. – Corstar Business Computing, Inc. has added software modules to DEC's Data System 340 minicomputer operating system, and based on this bigger operating system, the firm designs turnkey applications and provides turnaround systems.

Applications developed for the 340 include order entry, production control, billing, accounts receivable and payable, purchasing, sales analysis and inventory. The firm sells the DEC 340 for $38,000 with applications priced additionally.

Corstar is at 1 Aqueduct Road, 10606.

Calcomp Adds Drives for Univac CPUs

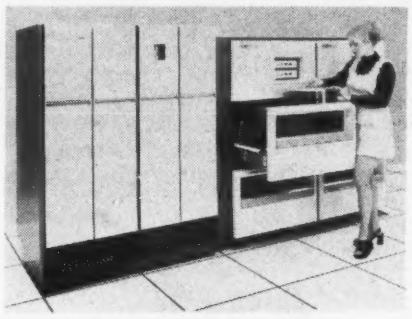
By Vic Farmer
Of the CW Staff

ANAHEIM, Calif. – California Computer Products (Calcomp) has announced four peripherals for Univac CPUs, bringing its Univac-compatible line to six alternative products. The Calcomp offerings average about 10% less than comparable Univac prices.

The four new products are:

- Calcomp 1160 disk drive system compatible with Univac 1100 and 400 series CPU. It can replace the Univac 8460 disk drive.
- Calcomp 8840 disk drive which can replace the Univac 8440 on the 1100s.
- Calcomp 8924 dual density disk drive system, compatible with Univac 9000 and Series 90 computers. It can replace Univac 8424/8425 and 8414 systems.
- Calcomp 8916 tape drive system, compatible with the Univac 9000 and Series 90 computers. It can replace the Uniservo 20C, 16C and 12C.

The 1160 disk drive system offers users the advantage of removable packs. It attaches directly to Univac 1100 and 400 selector channels with no modification of user application programs, according to Calcomp.



Calcomp 1160 Disk System

The 1160 controller users either two-spindle Calcomp 225 or single-spindle 224 drives and uses 11-high disk packs.

The 1160 has two configurations. The basic system consists of an 1160 with five spindles and offers storage equivalent to a Univan 8460 operating in the Fastrand emulation mode – 88M 36-bit words.

The second configuration offers twice the storage capacity of the basic system and consists of an 1160 controller with 10 spindles.

For either configuration, the 1160 controller may be single- or dual-channel. The dual-channel option permits simultaneous access and data transfer to or from any two files in the subsystem.

Monthly unit rental prices for a one-year lease are: $1,550 per single-channel controller, $2,400 per dual-channel controller, $890 per 225 disk drive and $445 per 224 disk drive.

3330-Compatible Spindle

The Calcomp 8840 basically provides Univac users with an IBM 3330-compatible pack spindle. This characteristic does, however, sacrifice about 16M bit/spindle over the comparable Univac system, Calcomp admitted.

The 8840 has two disk drive options. The Calcomp 430 cabinet contains two separate, independent, removable-pack drives, and each dick pack can store up to 22M 36-bit words.

The Model 430 uses 192 track/in. technology. Average track-to-track access time is μsec; data transfer rate is 6.45M bit/sec at 3,600 rev/min.

The Calcomp 431 contains one spindle per cabinet but is otherwide operationally identical with the Model 430. Both models use IBM 3336/1 or equivalent packs.

Monthly unit rental prices for a one-year lease are: $1,720 per single-channel controller, $3,440 per dual-channel controller and $415 per 430 or 431 spindle.

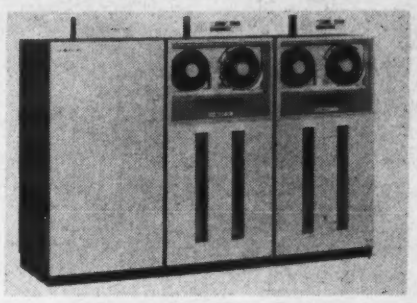
On-Line Diagnostics

The Calcomp 8924 disk drive system provides double-density spindles compared with the single-density Univac 8424/8425 and 8414. The 8924 controller has control and on-line giagnostics for up to 16 logical elements with a maximum on-line capactiy of 466M bytes.

Monthly rates for a one-year lease of the Calcomp 9824 are: $990 per controller, $640 per 415 disk drive and $320 per 413 disk drive.

The 8916 magnetic tape system offers Univac users tape technology on the level of IBM's 3420s, Calcomp said.

The system consists of a Model 8916 controller and up to eight Calcomp 316 and 320 tape units in any combination of 9-track single-density (1,600 bit/in.) or dual-density (800/1,600 bit/in.). The system also accommodates 7-track (556/800 bit/in.) tapes.



Calcomp 8916 Tape System

Both the 316 and 320 tape drives feature automatic tape threading. The 316 unit has a tape speed of 125 in./sec and a nominal read/write access time of 1.9 μsec.

The 320 tape unit features a tape speed of 200 in./sec and a nominal read/write access time of 2 μsec.

Monthly rates for a one-year lease are: $485 per single-density controller, $585 per dual-density controller, $585 per 7-track controller, $490 per single-density or 7-track 320 tape drive and $400 per single density or 7-track 316 tape drive. Dual-density capability in either 320 or 316 drives costs an additional $20/mo.

Monthly lease rates for all products do not include maintenance, and deliveries are slated for the beginning of 1975.

Calcomp is at 2411 West La Palma Ave., 92801.

Text Processor Has 7,000-Char. CRT Unit

CHATSWORTH, Calif. – Lexitron Corp. has introduced a text processor system that consists of an electronic keyboard, a 7,000-char. CRT, a floor unit with text processing logic modules, magnetic tape cassette storage system and a 340 word/min output printer.

The Videotype 92 system does not yet have communications capabilities, although a spokesman said the firm plans to add them.

Users who acquired Lexitron's earlier Videotype 91 system under a purchase or 60-month lease arrangement will receive the purchase price as credit against the 92, according to Lexitron.

The Videotype 92 costs $20,250 with one year's maintenance. The 60-month lease costs $459/mo and the 12-month lease costs $535/mo. Both lease prices include maintenance from the firm at 9600 DeSoto Ave., 91311.

S/3 Option Allows Lower-Cost 3741 Attachment

By a CW Staff Writer

ATLANTA – IBM has added a lower-cost but higher-throughput option for the local attachment of IBM's 3741 data entry diskette station to any System/3 CPU using disk. The 3741 Direct Attachment Feature replaces use of the Local Communications Adapter (LCA) and offers a throughput increase of "more than three times," according to IBM.

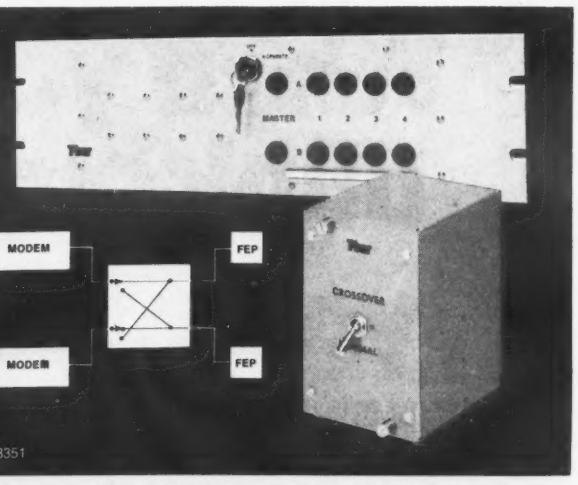
The feature will rent for $265/mo and represents a possible savings of $188/mo: the price of the eliminated LCA of $153/mo and about $35/mo because the LCA requires a more expensive 3471 Model 2 station.

The new feature can be attached to any of the 3741 models and is connected as a disk drive. In operation, the diskette is unloaded through the CPU to the CPU disk. The 3741 can be located up to 40 feet from the CPU.

Options connecting the 3471 through binary synchronous communications adapters remain unchanged. The feature will be available in June 1975.

T-BAR Cross Over Switches... simple channel interchange in a single switch!

T-Bar Cross Over Switches are available in configurations with 2 and 4 paired channels and come with three basic controls: Manual, Local; Computer and ASCII Unattended Remote, for either rack or wall mounting.



Write or phone today for complete literature and the T-Bar Communications' Systems Switching Chart.

T-bar INCORPORATED
DATA SYSTEMS DIVISION
141 Danbury Road, Wilton, CT 06897 • Telephone: 203/762-8351

Regional Sales Offices: Boston (617) 890-3085 • Chicago (312) 671-5182 • Columbus (614) 888-0722 • Canada (613) 737-5941 • New York (203) 762-8351 • Philadelphia (215) 363-1544
Los Angeles (213) 879-9045 • Washington, D.C. (703) 528-7773 • San Francisco (415) 569-6461 • Seattle (206) 624-9020 • Denver (303) 794-4231

When you make as many minicomputers as we do, you make an incredible number of peripherals, too.

Out there with our 33,000 computers are countless Digital peripherals – teletypewriters, video terminals, tape drives, and remote terminals. Plus Digital interfacing and logic modules. And Digital component computers and controllers.

And now that the Components Group is unbundling our peripherals, we're planning to expand our manufacturing capability even more.

Because when you supply as many peripherals as we plan to, you've got to get them delivered on time.

We're the Components Group of Digital Equipment Corporation, One Iron Way, Marlborough, Massachusetts 01752. 800-225-9480, toll-free from 8:30AM to 5:00PM your time. (US only. Massachusetts residents, please dial (617) 481-7400, ext. 6653.)

In Canada: Digital Equipment of Canada Limited, P.O. Box 11500, Ottawa, Ontario, K2H8K8. (613) 592-5111, ext. 154.

digital

COMPONENTS GROUP

Unbundling the world's most popular minicomputers.

Bits & Pieces

Digitizing System Performs Postprocessor Software Jobs

BROOMALL, Pa. – The D-200 computerized digitizing system from Broomall Industries, Inc. utilizes the flexibility and formatting capability of a digital computer to reduce total digitizing effort, the firm stated.

In addition to the typical digitizing operations, it can also perform many functions which are normally done via postprocessing software in a large computer, the firm said.

Keyboard inputs to the D-200 include such parameters as scale factors, offsets, resets, channel count, data constants, time-line increment, display mode and output formatting. The system is designed to handle such specific applications as variable linear and nonlinear scaling coordinate rotation, automation calibration, angle, perimeter and volume calculations and gridding to any selected value.

The price of the D-200 including 24-digit data display, processor and software is $9,980.

The firm is at 682 Parkway, 19008.

Wabash Diskette Is IBM Compatible

DES PLAINES, Ill. – Wabash Tape Corp. has introduced an IBM-compatible diskette and series of digital tape cassettes.

The floppy disk is packaged in a self-cleaning copolymer jacket and is coated on each side. Media life is claimed to be 3,500 hours or 1M rev/track.

The diskettes are priced at $8 each in boxes of 10.

The digital cassettes have a read/write speed of up to 120 in./sec, search speed up to 150 in./sec and have been tested at operating temperatures up to 113° F and relative humidity up to 80%, the firm said.

The S series cassettes are 100% certified at 1,600 flux changes/in. and have a fiberglass reinforced case.

The R series is less expensive and has corner rollers and slip sheets to allow use on cassette drives requiring moderate cassette guidance. The cassettes average about $7 each.

Wabash is at 2720 Des Plaines Ave., 60018.

Memorex Raises Prices 5%

SANTA CLARA, Calif. – Memorex has raised prices an average of 5% on its computer equipment for lease and maintenance customers not covered by a fixed-price contract.

Stop Watch Notes S/3 Halts

ORANGE, Calif. – The Stop Watch from Business Systems Technology, Inc. provides both a blinking light and adjustable buzz when an IBM System/3 is in a halt or stand-by mode.

The device is priced at $150 from the firm at 1215 W. Katella Ave., 92667.

Kit Cares for Punched Tape

NEW YORK – Users of punched tape can now have a complete splicing kit including an encoding block, stylus punch, 100-foot roll of prepunched feed hole tape and a choice of either black opaque patches or a bottle of white glue.

The kit is priced at $95 from Abcom Business Products, Inc., 376 Broome St., 10013. Prepunched tape and patches are available separately.

Iomec Services ADC Line

SANTA CLARA, Calif. – Iomec, Inc.'s customer engineering organization will provide field service for the Applied Data Communications (ADC) line of IBM-compatible floppy disk systems, 3M tape cartridge drives and Digital Equipment Corp.'s Program Loading System, according to ADC

Iomec will handle contract service on a third-party basis throughout the U.S., an ADC spokesman noted.

POS System Designed for Catalog Showroom Use

SANTA CLARA, Calif. – National Semiconductor Corp. has brought out a catalog showroom version of its Datachecker supermarket point-of-sale system.

The Datachecker terminal for supermarkets comes in stand-alone electronic cash register form or in a system using a controller with two minicomputers. It is also used in a scanning system with redundant disk, CPU, memory and power supply.

The supermarket terminal uses a LED display with five digits for dollars and cents plus four digits for weight readings. The catalog store model uses a six-digit LED for price only.

Both the supermarket and catalog store versions of the Datachecker rely on in-house processors. However, either system can be ordered with the capability to transmit at 2,000- or 2,400 bit/sec over dial-up lines.

The catalog store system can update store inventory as it is used to ring up sales, according to the firm.

A printer in the storeroom can print out picking slips indicating where the product will be found.

The datachecker 800CS catalog showroom system costs about $40,000 for a configuration including three registers, a picking printer, a fixed-head disk drive, mini-based controller and backup batteries.

Delivery is 60 to 90 days from the firm at 2900 Semiconductior Drive, 95051.

Turnkey Unit Organizes Map Data

SUNNYVALE, Calif. – The Calma Com. Interactive Mapping System enables a user to organize mapping information in a computer data base to suit almost any application and to retrieve that information selectively in the form of maps of various kinds, according to the firm.

Calma uses a 48-bit word that allows nine places for expressing decimal values.

The new system is a turnkey unit using a minicomputer for processing and control. The system can accommodate up to four CRT/keyboard input stations and up to three automatic digital plotters operating at the same time.

Through a so-called "tree-structure" data base, the user can organize mapping information in categories and subcategories. Once information is entered and classified, it can be retrieved as a complete map with all features or a select map depicting one or a number of categories or subcategories.

The ability to record information on different levels permits, for example, calling up only utility lines, political boundaries or bodies of water for analysis, modification or redrawing.

The Calma Interactive Mapping System with input station, high-speed plotter, a Data General Nova-2 minicomputer and associated peripherals and computer operating software sells for $130,000.

The firm is at 707 Kifer Road, 94086.

One good decision...

Few would quarrel with the choice of a Nova 2/10.

Good performance. Good price. Good software. Just a fine minicomputer. Period.

To solve your problem, however, it needs a lot of other things to go with it. Which is where we come in.

We make it all work.

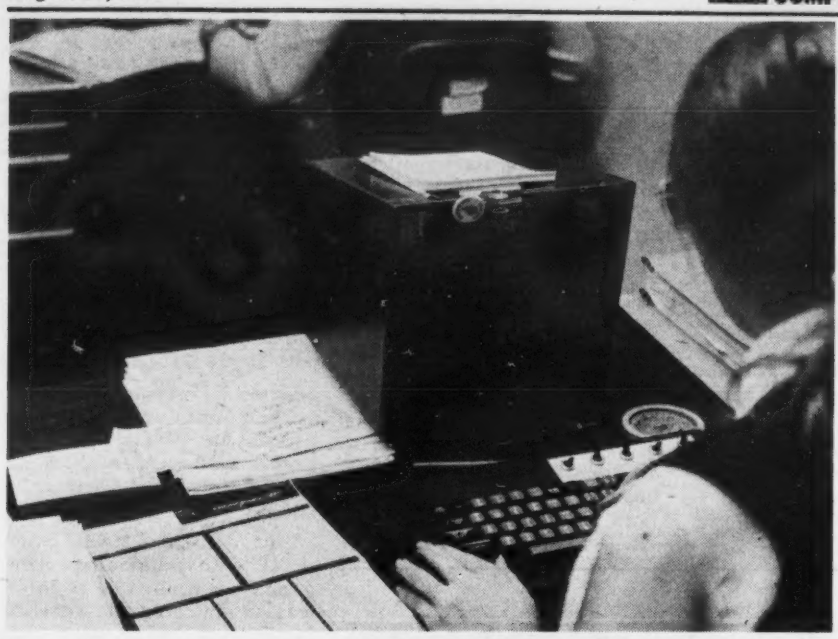
With peripherals to move and store your data. With controllers to make sure they all get along together. With system as well as custom software to give you something to work with. Indeed, even with entire systems.

The vital link.

The controllers we make—like the one you see there with the 2/10 — are unlike any you'll see elsewhere. They're all on a single 15-inch board, for example, so they occupy a single I/O slot, and require no external formatters or adapters. And we make them for all sized disk drives as well as both NRZI and PE tape drives.

Data in, data out.

The peripheral systems we make come in all shapes, sizes and kinds. Complete with controllers,



Key-to-disk data entry functions at the Cleveland Clinic are combined with the system's CRT prompting features to allow direct entry of statistical information with further coding.

End-User Data Entry the Heart Of Cardiovascular Analyses

CLEVELAND – Input of technically oriented and specialized data for computer analysis can be a tricky proposition, but the Cleveland Clinic here has solved the problem.

Rather than have the regular data entry personnel handle a special project to analyze and review the cardiovascular surgical procedure data base, the clinic put the data entry keystation at the heart of the action.

Specially assigned medical clerks work directly with the medical staff at the source of the information in the clinic's cardiovascular services department.

The clerks then use Inforex key-to-disk data entry equipment to prepare computer files from the patient data collected.

According to E.A. Dillehay, DP manager for the clinic, "our reasoning for this move was that the medical data to be entered into the computer is highly technical, and there are wide variations in information from patient to patient. In one instance cardiac information may be entered; in another, life history statistics are required. We feel it is important, therefore, that the surgical department have its own medical data preparation personnel."

By using the data entry system's prompting function, operators familiar with the many different forms of patient data can enter it directly from special source documents, with no further coding or transcribing into machine-acceptable formats, Dillehay said.

In the cardiovascular services department, a number of patient monitoring devices, set up through private funding, provide source data for a special six-page patient history questionnaire. These histories are compiled for further computer analysis and expert review for the clinic's continuing efforts in coronary research.

To permit this form of data entry into the mainframe computers, Cleveland Clinic takes advantage of the preformatted prompting capability of the data entry system with a program called Pre-Enter System Questions Approach by the clinic. This software allows the operator to call up the appropriate data entry medical record or patient statistics program from the disk storage in the Inforex control unit.

Then the operator fills in the blanks as they appear on the CRT screen at the keystation, visually checking for data inconsistencies in the information entered. Other program information that can also be entered includes ulcer surveys, coronary risk data, and other clinical test information.

"The fact that Cleveland Clinic was already using an Inforex 1302 key-to-disk data entry system made this decision for direct department support much easier," Dillehay said.

"The basic reason a key-to-disk system is so easy to use and requires relatively little training is the CRT display at each station. The CRT lets the operators see the full record as it is being entered, which is especially important in this instance of data entry by non-DP personnel," Dillehay added.

In addition to the cardiovascular services department, another special department at the clinic currently makes use of a remote data keystation. The personnel department handles confidental information by retaining data preparation functions within the personnel department staff.

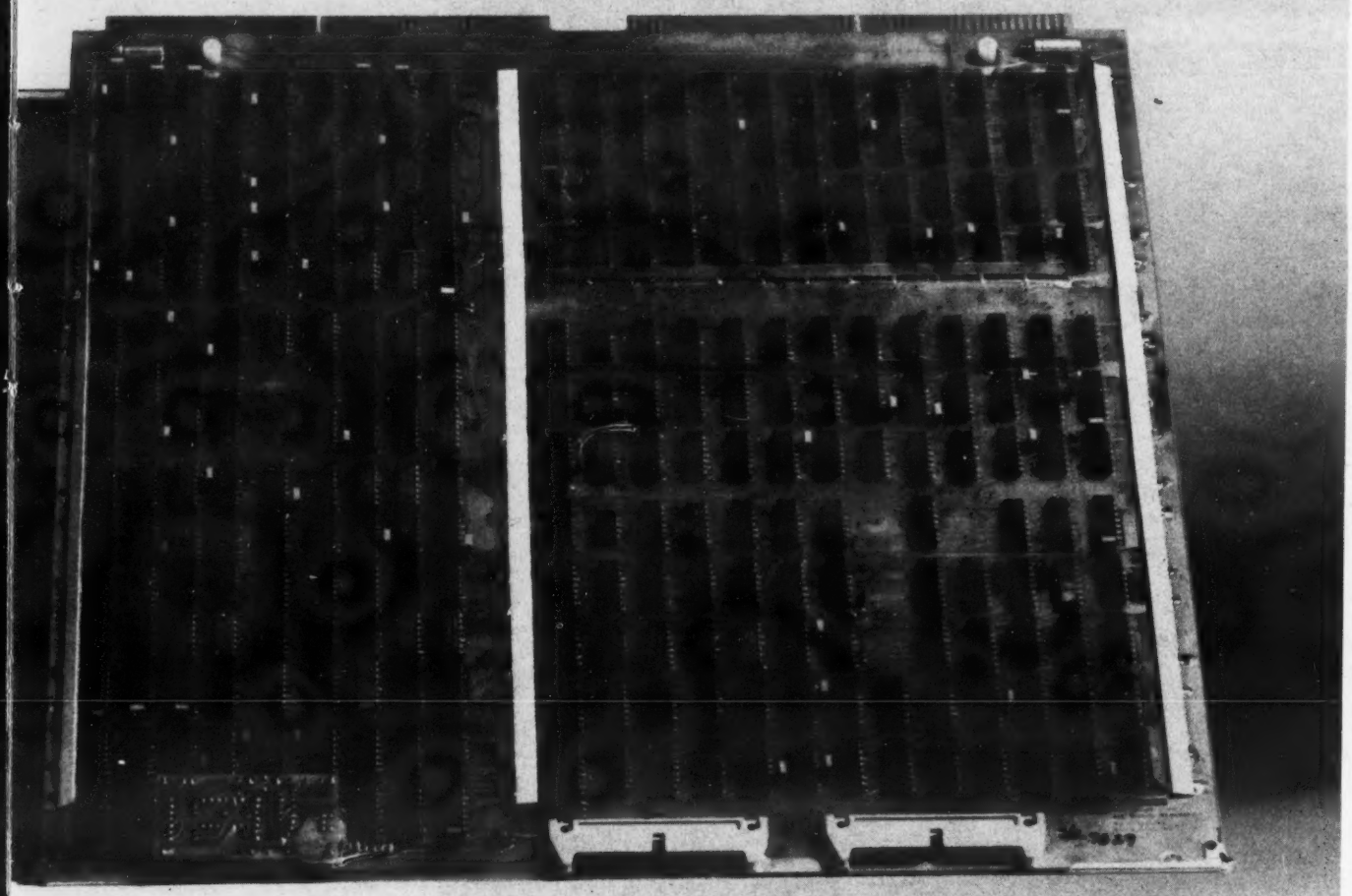
The conversion to the Inforex system, beginning with the installation of a 1301, has resulted in an increase in data throughput of 10% to 15% as compared with the clinic's previous key-to-tape data entry equipment, Dillehay said. And operators in the cardiovascular services department were able to satisfactorily operate the key-to-disk system after three hours of instruction.

Consistent with the running of a large medical facility, the bulk of the data preparation work at Cleveland Clinic is concerned with the maintenance and processing of patient accounts. The key-to-disk system currently processes some 50,000 open accounts each month.

In addition, the clinic maintains records on a regular basis of almost 350,000 patient accounts, entering data and preparing files on an average of 200 new patients each day.

Aside from the standard accounting functions of payables, payroll and receivables, including Blue Cross billing, the clinic's DP department enters and maintains records for many non-commercial applications. These include files on doctor registry and scheduling, blood bank and pharmacy inventory control, nurse recruiting, hospital and clinic pathology, A/R x-ray and security.

calls for another.



drives, power supplies, cables, terminators, diagnostic and operating software and documentation. And a whole staff of support and service people dedicated to keeping you happy with it all.

Plug and run.

The complete minicomputer systems we make are built around a 16K-core Nova processor — with peripherals, disk operating systems and everything else you'll need — all ready to plug in and run.

Why we make all this stuff.

Last, but far from least, we make a family of optical data entry systems — the real reasons why we originally made all those other things. We designed and built them for our own OCR 7600 optical character recognition systems. And our own OMR 6500 optical mark reader and mark capture systems. In fact, we're our own best customer.

So we've made a few good decisions, too.

Few would quarrel with that.

Decision, Inc.
5601 College Avenue,
Oakland, California 94618.
(415) 654-8626

DECISION

SALE 370/165 LEASE

• 3165K • 3067 • 2870 • (4) 3360
• 3066 • 2860 • 2880

370/155 I WITH DAT

Contact B. Gest
COMPUTER MARKETING INC.
(215) 635-6112
7704 Seminole Ave., Melrose Park, Pa. 19126

NCC Committee Chairman Named

Jeffrey D. Stein, president of On-Line Business Systems, has been appointed chairman of the National Computer Conference Committee. The NCC Committee is responsible for providing ongoing administrative support to the conferences and assists the NCC board in overall planning and policy.

***

September 1974 has been declared Project ICCP month by charter members of the Institute for Certification of Computer Professionals, in order to publicize support for the institute and the Certificate in Data Processing (CDP) examination.

***

The American Federation of Information Processing Societies (Afips) has a brochure entitled "All You Ever Wanted to Know About Afips Constituent Societies . . . But Could Never Find in One Place." The booklet is available free from Afips headquarters, Public Information Office, 210 Summit Ave., Montvale, N.J. 07645.

Society Sundries

Calendar

Sept. 4-7, Berlin – **International Congress for Data Processing (IKD) Berlin 1974.** Contact: AMK Ausstellungs-Messe-Kongress-GmbH, 1000 Berlin 19, Messedamm 22, Germany.

Sept. 4-13, Chicago – **International Machine Tool Show 1974.** Contact: National Machine Tool Builders' Show, Inc., 7901 Westpark Drive, McLean, Va. 22101.

Sept. 11-13, San Francisco – **Sixth Annual Conference of the Society for Management Information Systems.** Contact: Smis, 221 N. LaSalle St., Chicago, Ill. 60601.

Sept. 15-20, Mainz, Germany – **International Symposium on Economics of Informatics.** Contact: IBI-ICC Symposium, International Convention Consultants, 6 Frankfurt am Main 70, Letzter Hasenpfad 63, Federal Republic of Germany.

Sept. 16-20, Paris – **Convention Informatique.** Contact: Convention Informatique, 6 Place de Valois, 75001 Paris, France.

Sept. 22-25, New Orleans – **1974 Annual Bank Card Convention of the American Bankers Association.** Contact: ABA, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Sept. 22-25, Toronto – **Second User Services Conference,** sponsored by the ACM Special Interest Group on University Computing Centers. Contact: Dave McNaughton, Computing Center, University of Toronto, 10 Kings College Road.

Sept. 24-26, Brunel, England – **Minicomputer Forum.** Contact: On-Line, Brunel University, Uxbridge, Middlesex, England.

Sept. 24-27, London – **CAD 74,** international conference and exhibition on computers in engineering and building design. Contact: Computer Aided Design, IPC House, 32 Guildford St., Guildford, Surrey, England.

Sept. 25-28, Caracas, Venezuela – **11 Seminar of Technical Computing.** Contact: E. Lorenzoni, c/o Avice, Apartado de Correos 2006, Caracas, Venezuela.

Sept. 19-27, Paris – **Sicob 74.** Contact: French Trade Shows, French Chamber of Commerce, 1350 Ave. of The Americas, New York, N.Y. 10019.

Sept. 25-28, San Diego, Calif. – **Telecommunications Association Conference.** Contact: TCA 1974 Conference, Box 109, Burbank, Calif. 91503.

the un-limiters

13 reliable printers and teleprinters to un-limit your choices.

In just over three years, Centronics turned instant success into an enduring phenomenon.

One model then.

Thirteen now.

Choice instead of compromise. Now you can select printers/teleprinters to fit your system – rather than the other way around. That goes for options and interfaces, too!

Today, nine printers. Proven performance. In speeds from 100 to 600 cps. 40 to 200 lpm. In 80 and 132 column models.

Today, four teleprinters. Fast. At 120 cps, there's a major reduction in telephone line costs. 110 to 9600 baud (fdx or hdx). In 80 and 132 column models.

Today, tens of thousands of Centronics units are in operation – proof of Centronics' acceptance all over the world.

And tomorrow, another phenomenon? Count on it!

the centronics phenomenon: it knows no bounds.

CENTRONICS
centronics data computer corp.
hudson, n.h. 03051
telephone (603) 883-0111

eastern region: (617) 272-8545
central region: (513) 294-0070 (ohio)
western region: (714) 979-6650 (s. calif.)
centronics data computer (canada) ltd.
mississauga, ontario (416) 625-0770

COMPLETE
LOW COST
DATA-ENTRY SERVICES

•

OCR SERVICES
SCANNING: HANDPRINT • OCR A
MARK READ • COMPUTER PRINT

•

OCR TYPE/SCAN

•

KEYPUNCH • KEYDISC/TAPE
UNIVAC • IBM • CMC

DATA-MIDWEST
CORPORATION

7803 BLOOMINGTON AVE. SO.
MPLS. MN 55420, (612) 854-5522

4 MIN. FROM MPLS-ST. PAUL INTL. A.P.

To Detect Abnormalities During Labor

Monitor to Pick Up the Pitter-Patter of Little Hearts

By Edith Holmes
Of the CW Staff

PITTSBURGH – Three Carnegie-Mellon University (CMU) bioengineers and a hospital physician here are working to develop a computerized method for monitoring the fetal heartbeat during labor.

Such computer monitoring could help to reduce mental retardation, neurological damage and the number of stillbirths during the delivery process, said Thomas A. Reichert, chairman of CMU's biotechnology program. He said researchers estimate that 28,000 – or 40% – of stillbirths in the U.S. take place after labor begins.

Divided into two parts and financed through various grants, the project will develop bedside monitors designed to record electrical signals from the fetal heartbeat and software intended to interpret these signals from a data base of recognizable heartbeat patterns as they are fed into a Hewlett-Packard 2100, Reichert explained.

By combining signal representation techniques and computerized monitoring, he hopes to clarify the electrical signals of the fetal heartbeat pattern for rapid diagnosis of possible abnormalities.

Joining Reichert in the combined university-hospital effort are Richard L. Longini, instructor in solid state electronics at CMU's electrical engineering department, and John S. Detwiler, a biomedical engineer at CMU and the Veterans Administration Hospital in Pittsburgh. Collaborating with them is Dr. Richard Depp, assistant professor of obstetrics, gynecology and pediatrics, at Magee-Womens Hospital.

Hope for Earlier Warnings

The researchers expect that continual computer monitoring of fetal heartbeats will result in quantitative techniques to give earlier warning signs of situations threatening the unborn child and/or its mother. They also anticipate a savings in medical personnel without sacrificing the security of maternity patients and their babies during prolonged periods of labor.

Present plans call for the monitoring of 12 patients on-line to the HP 2100 via analog devices. The Detwiler-Depp half of the team intends to have the computer system up in a year.

Detwiler plans to program the computer with interpretive criteria developed by fetal monitoring experts throughout the country.

Stethoscope Replaced

Electronic fetal monitoring, in general use since 1969, has widely replaced the stethoscope and other, more sophisticated methods of following the progress of "high risk" childbirth – involving mothers with diabetes, high blood pressure, or other diseases, as well as those who develop unanticipated complications during pregnancy.

But while such monitoring has already contributed to a decrease in fetal death rates, its application remains limited by the difficulty of obtaining a reliable heart rate measurement and the limited number of medical people with the training and experience necessary to interpret changing heart rate patterns, Reichert commented.

How the Winds Blow Measured by 'Winds'

PATRICK AFB, Fla. – A data system installed here for Cape Canaveral and the Kennedy Space Center records information about the atmosphere in case of accidental release of toxic fuel vapors or other harmful materials by departing spacecraft or aircraft.

The Weather Information Network and Display Systems (Winds) monitors the diffusion characteristics of the area around the space center, according to a spokeswoman for the Air Force Eastern Test Range.

Checking the Atmosphere

Winds automatically gathers, processes, records and displays meteorological data, keeping tabs on the state of the atmosphere should a dangerous situation arise, she added.

The system consists of 16 stationary towers, ranging in height from 54- to 500 feet; wind, temperature and dew point sensors attached to the towers at various heights; a Univac 1218 computer, which receives and processes sensor measurements; and a teletypewriter circuit of three terminals with printers that display the processed data.

The spokeswoman said processed information is punched onto paper tape and printed for the use of the staff. Available in 30-, 15- or 5-minute readouts, the displayed data consists of numerical values for a number of variables, including wind direction and speed, wind gusts, temperature, dew point and lapse rate (temperature change with height variations); two distances for diffusion plumes depending on the concentration of the toxic vapor in air; and standard deviations of the wind direction.

Diffusion data is printed and arranged by tower for corresponding sensors, the spokeswoman explained. Tower data is further separated into three geographical groups, each stretching from north to south and parallel to each other as one moves inland from the Atlantic Ocean.

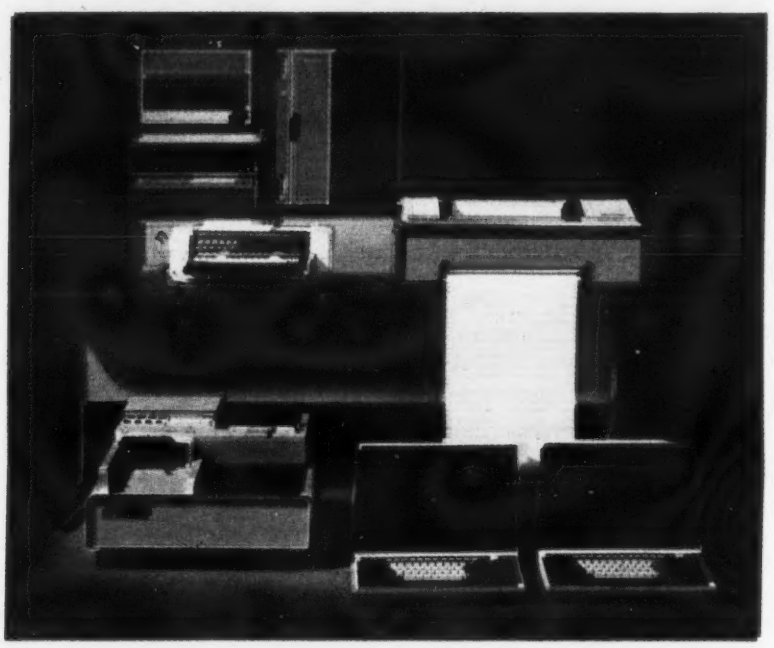
System Helps Faculty Negotiate Salaries

JOLIET, Ill. – A computer is playing the arbiter in a junior college here whenever faculty and administration meet for salary negotiations.

Developed by Ronald Bleed, DP director at Joliet Junior College on an NCR Century 101, the labor costing system is used primarily to calculate salaries based on the schedule under consideration.

The system also projects salaries for five years, costs fringe benefits, identifies workload units, calculates work reduction proposals, lists frequency distribution of employees and generates the new schedule.

Although geared toward the school environment, the system is written in Cobol and can be used on most computers for various labor costing problems, according to Bleed.



This minicomputer gives you the data base management you'd expect on a $1,000,000 computer. It costs $78,000.*

HP's Management 260 System lets you keep from 5 million to 94 million bytes of data instantly active . . . on-line. Make application programs data independent. Eliminate data redundancy and insure data privacy.

This innovation works for a living.

If you do, call us.

HP minicomputers. They work for a living.

HEWLETT hp PACKARD

Sales and service from 172 offices in 65 countries.
1501 Page Mill Road, Palo Alto, California 94304

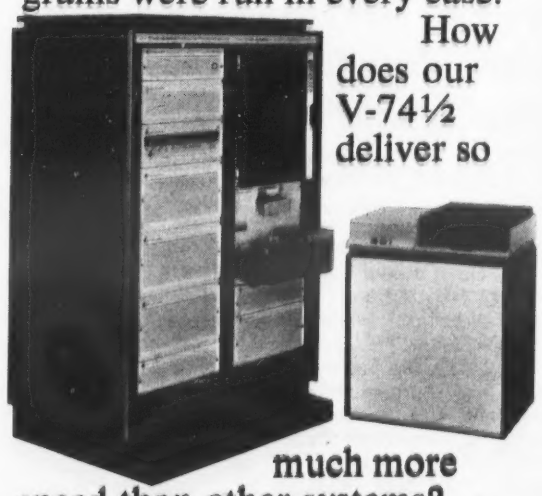
*Domestic USA prices. 22414

Why single out DEC, when you've

When Varian runs a benchmark, it becomes a milestone. As you can see from these latest figures comparing the performance of our V-74½ with others.

It makes the competition's claims about their superior performance just that. Claims.

All these tests—and more—were run within the last 90 days. On the latest operating systems and compilers. And the same FORTRAN benchmark programs were run in every case.



How does our V-74½ deliver so much more speed than other systems?

The VORTEX operating

beaten them all.

Typical FORTRAN execution times (microseconds)

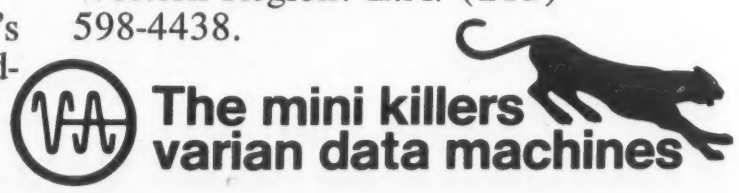
	V74½	PDP-11/45	Nova 800	Mod Comp II	H.P. 2100
A=B+C	7	33	58	19	51
(double) A=B+C	10	82	61	29	98
A=B	4	14	35	7	13
Do Loop	4	22	10	11	17
A(I,J,)=B	22	63	39	28	46
A=Sin(B)	100	251	266	197	1583

system, for one thing. Augmented by the firmware FORTRAN accelerator and our new Floating Point Processor, no one can argue with the fact that it's the fastest, most powerful, most sophisticated FORTRAN IV processor in the business.

No one beats the V-74½'s synergistic combination of hardware, software and firmware enhancements. Especially DEC, Data General, Mod Comp and H.P.

And we have the reports to prove it. For your copy call your nearest Varian Data Machines office.

Varian Data Machines
2722 Michelson Drive, Irvine, California 92664. Eastern Region: N.Y. (212) 325-5248. Western Region: L.A. (213) 598-4438.



Product Margins Maximized

CINCINNATI – DuBois Chemical Co. here is using linear programming to maximize gross margin for some 600 specialty products.

According to Nelson Wittman, director of research for the manufacturer of industrial cleaners, the system was developed when it became obvious that supplies of some raw materials would be inadequate to fulfill 1973 and 1974 sales forecasts.

With inadequate supplies of some, but not all raw materials, DuBois management had to decide which of some 600 products should be manufactured, Wittman explained.

The scheme DuBois evolved was one of maximizing the total gross margin for the product line by using the raw materials to produce the largest tonnage of the most profitable items.

In running the system on a Century computer, Wittman said, DuBois can consider up to 180 products and 49 raw materials at one time. Raw material price changes are entered as exceptions to update the costing of each product.

Mini Analyzes Aerial Photographic Data

MELBORUNE, Australia – A minicomputer is being used by a company here to analyze photographic data collected to develop large-scale plans for civil engineering projects.

A commercial photogrammetric company, Australian Aerial Mapping has installed a Data General Nova 840 to handle work previously accomplished through time-sharing services.

In developing plans for government departments and agencies, mining companies and many private surveying and consulting engineering firms, the mini will be programmed to carry out calculations in aerial triangulation and the digital photogrammetric field, a spokesman explained.

Overlapping Photos

"Digital photogrammetry involves the measurement of volumes, capacities and earthworks by obtaining three-dimensional coordinates from overlapping pairs of aerial photographs," he noted. Because this technique generates large amounts of data, a computer becomes a more efficient means of processing than calculation by hand.

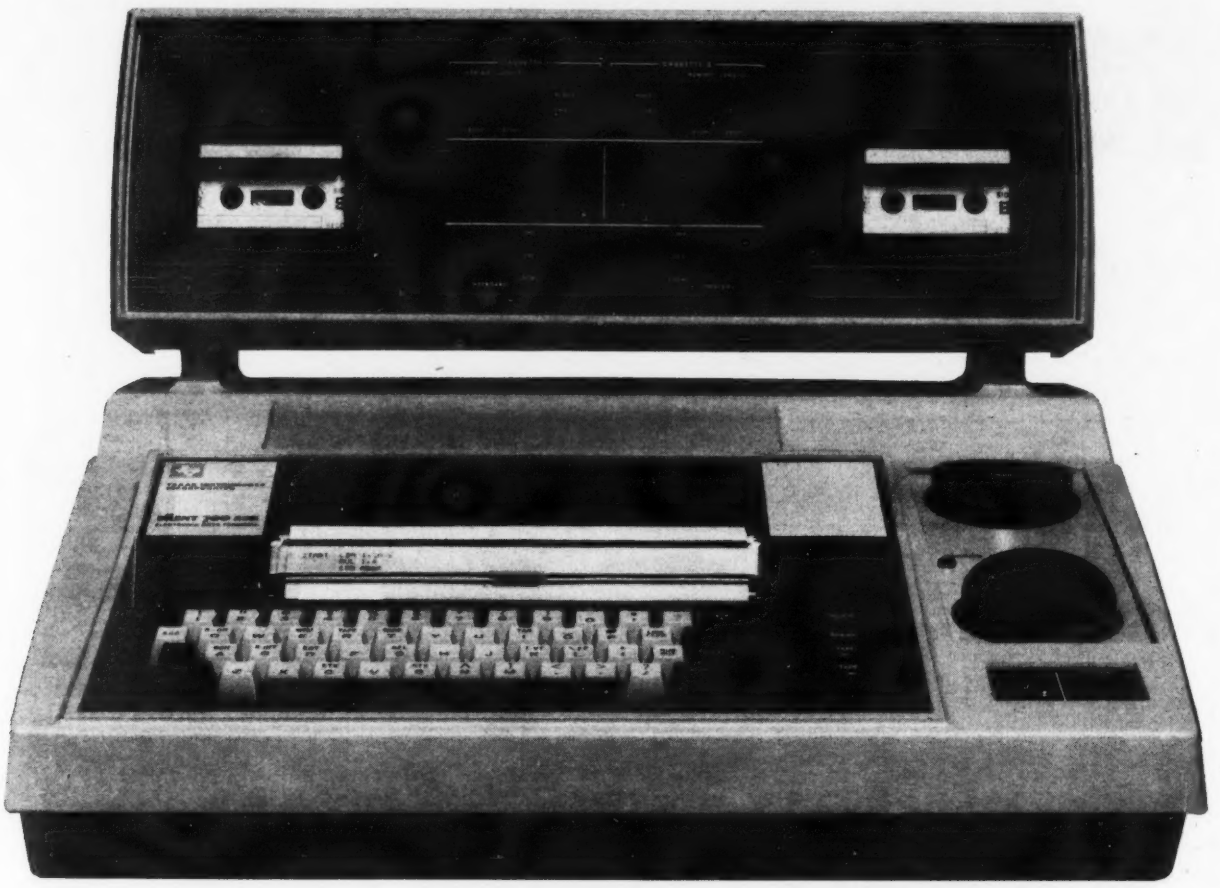
"For example, while the breakdown of a single mathematical model needed to map a particular area may require an hour of calculation by hand, the same problem can be completed on the mini in five minutes, including printout time," the spokesman said.

Time Saved

The analysis of some 200 picture/job demanded eight weeks of field survey, 100 hours of calculations and $10,000 by hand, he added. "For one week of field survey, two days of calculations and $1,000, the mini can perform the same analysis."

Time-sharing cost the company anywhere from $3,000- to $6,000/mo. The spokesman commented Australian Aerial Mapping will spend $62,000 on the Nova system.

"Silent 700" ASR data terminals



Now...with powerful new options. Proven speed and reliability. Same low prices.

High-performance *Silent 700** Automatic Send/Receive Data Terminals now offer powerful new options.

New Binary Data Format option permits recording and transmission of data in 8-bit binary code format . . . ideal for loading and storing computer object programs.

New Built-in Acoustic Coupler provides on-line communications capability and off-line data preparation in a totally integrated terminal.

Additionally, Automatic Device Control and Automatic Search Control options give you powerful capabilities for preparing, editing and manipulating cassette files locally.

Same low prices start at $2750 and basic lease rates range from $95 to $120 per month.

And all *Silent 700* ASR terminals feature twin magnetic tape cassettes along with quiet, non-impact printing at speeds up to 30 characters per second and offer transmission rates to 120 characters per second.

Then there's proven reliability and freedom from scheduled maintenance that cut data handling costs and maximize "up-time" for you.

And, deliveries of standard ASR models and options can be planned to meet your installation schedules . . . deliveries are faster than ever.

For more information on *Silent 700* ASR terminals, contact the nearest TI office listed below or contact Texas Instruments Incorporated, Digital Systems Division, P.O. Box 1444, Houston, Texas 77001, phone (713) 494-5115, extension 2126.

*Trademark of Texas Instruments Incorporated

Arlington, Va. (703) 527-2800 • Atlanta, Ga. (404) 458-7791 • Boston, Mass. (617) 890-7400 • Chicago, Ill. (312) 671-0300 • Clark, N.J. (201) 574-9800 • Cleveland, Oh. (216) 464-1192 • Dallas, Tx. (214) 238-5318 • Dayton, Oh. (513) 253-6128 • Denver, Co. (303) 758-5536 • Detroit, Mich. (313) 353-0830 • Hamden, Conn. (203) 281-0074 • Houston, Tx. (713) 777-1623 • Huntsville, Ala. (205) 837-7510 • Indianapolis, Ind. (317) 248-8555 • Milwaukee, Wis. (414) 475-1690 • Minneapolis, Minn. (612) 835-5711 • New York, N.Y. (212) 541-9540 • Orange, Ca. (714) 547-9221 • Orlando, Fla. (305) 644-3535 • Philadelphia, Pa. (215) 643-6450 • Phoenix, Az. (602) 249-1313 • Rochester, N.Y. (716) 461-1800 • San Francisco, Ca. (408) 732-1840 • Seattle, Wash. (206) 455-1711 • St. Louis, Mo. (314) 993-4546 • Amstelveen, Holland 020-456256 • Bedford, England 58701 • Copenhagen, Denmark (01) 917400 • Frankfurt, Germany 0611/39 9061 • Manchester, England 33411 • Milano, Italy 6888051 • Montreal, Canada (514) 332-3552 • Paris, France (1) 630-2343 • Stockholm, Sweden 67 98 35 • Sydney, S. Australia 837-015 • Toronto, Canada (416) 889-7373

TEXAS INSTRUMENTS
INCORPORATED

At Robert Half all we do is place competent Financial & Data Processing personnel.

That makes us very good at it.

Albuquerque, 2201 San Pedro N.E.	(505) 266-5557
Allentown, 1401 Cedar Crest Blvd.	(215) 439-1506
Alexandria, Va., 5001 Seminary Road	(703) 931-3600
Atlanta, 3379 Peachtree Road N.E.	(404) 233-2416
Baltimore, The Quadrangle–Cross Keys	(301) 323-7770
Boston, 140 Federal St.	(617) 423-6440
Charlotte, 4801 E. Independence Blvd.	(704) 535-3370
Chicago, 333 N. Michigan Ave.	(312) 782-6930
Cincinnati, 606 Terrace Hilton	(513) 621-7711
Cleveland, 1367 E. 6th St.	(216) 621-0670
Dallas, 2001 Bryan Tower	(214) 742-9171
Denver, 1612 Court Place	(303) 244-2925
Detroit, 670 Honeywell Center, Southfield	(313) 559-1212
Hartford, 111 Pearl St.	(203) 278-7170
Houston, 1200 Central Nat'l Bank Bldg.	(713) 228-0056
Indianapolis, 921 East 86 St.	(317) 253-5545
Kansas City, Mo., 127 West 10th St.	(816) 474-4583
Lancaster, Pa., 8 North Queen St.	(717) 299-5621
Long Island, 420 Jericho Turnpike, Jericho	(516) 822-8080
Los Angeles, 3600 Wilshire Blvd.	(213) 386-6805
Louisville, 680 South 4th St.	(502) 589-6657
Memphis, 12 S. Main St.	(901) 523-8950
Miami, 1190 N.E. 163 St., No. Miami Beach	(305) 947-0684
Milwaukee, 777 East Wisconsin Ave.	(414) 271-9380
Minneapolis, 80 South 8th St.	(612) 336-8636
Newark, 1180 Raymond Blvd.	(201) 623-3661
New York, 330 Madison Ave.	(212) 986-1300
Omaha, 7101 Mercy Road	(402) 397-8107
Orange, Cal., 500 South Main St.	(714) 835-4103
Philadelphia, 2 Penn Center Plaza	(215) 568-4580
Phoenix, 1517 Del Webb TowneHouse	(602) 279-1688
Pittsburgh, Gateway Towers	(412) 471-5946
Portland, Or., 610 S.W. Alder St.	(503) 222-9778
Providence, 400 Turks Head Bldg.	(401) 274-8700
San Diego, 525 B St.	(714) 239-9001
St. Louis, 7733 Forsyth Blvd., Clayton	(314) 727-1535
San Francisco, 111 Pine St.	(415) 434-1900
San Jose, 675 North First St.	(408) 293-9040
Scranton, 407 Connell Bldg.	(717) 961-5821
Seattle, 1215 Fourth Ave.	(206) 624-9000
Stamford, Ct., 111 Prospect St.	(203) 325-4158
Tampa, 1311 N. Westshore Blvd.	(813) 876-4191
Washington, D.C., 7316 Wisconsin N.W.	(301) 652-1960
Wilmington, 1102 West St.	(302) 652-3244
London, England, 17 Finsbury Square	01-638-4394
Toronto, Canada, 15 Toronto St.	(416) 868-1314
Vancouver, Canada, 535 Thurlow St	(604) 688-7726

ROBERT HALF PERSONNEL AGENCIES

COMPUTER INDUSTRY

CI Notes

IBM Strengthens GSD Unit

ARMONK, N.Y. – In an extension of its move last January to give the General Systems Division (GSD) more autonomy over the machines it manufactures, IBM will give the GSD complete authority for marketing and field service of its products, which include the System/3 and System/7, effective Sept. 1.

Since January, a System/3 or System/7 in an installation that had large IBM equipment was under the jurisdiction of the Data Products Division. Now, however, the GSD is responsible for such machines.

Although personnel have been transferred between divisions, the same service and market personnel will continue to handle the GSD products.

The move is seen by some as presaging an announcement of the much-heralded System/2.

Firm Extends Orbis Order

COSTA MESA, Calif. – Orbis Systems, Inc. has received an extension of its contract with Data Recording Instruments Ltd. for the Model 74 diskette drive. The contract is valued at $1 million.

Memorex Leases Headquarters

SANTA CLARA, Calif. – Memorex has leased its headquarters building to General Electric's Nuclear Energy Division for one year with two one-year options. Memorex staff formerly in the building has been dispersed into two other buildings in the campus-like complex. The move is part of President Robert C. Wilson's drive to cut costs.

Memory Market to Stabilize

SAN JOSE, Calif. – The peripheral memory market faces a period of stabilization before it resumes the high growth rates experienced in the past, according to a study by Creative Strategies, Inc.

Worldwide sales of peripheral memory hardware products are expected to grow to $7.1 billion in 1978 from $4 billion in 1983.

The minicomputer segment of the memory market, while representing a small percentage of the total market, will grow substantially during the next five years, the study concluded.

Datapoint Orders Shugart Drives

SUNNYVALE, Calif. – Shugart Associates has received a contract from Datapoint Corp. to supply IBM-compatible SA900 diskette drives.

The initial order is valued at $200,000 with a potential value in excess of $2 million over a two-year period.

Supershorts

Nixdorf Computer AG, West German manufacturer of small business computer systems, has opened a development and manufacturing division in Costa Mesa, Calif., to develop products aimed at bringing media-compatible mass storage devices to Nixdorf's existing and future product lines.

– – –

Periphonics Corp. has installed over 100 of its T-COMM 7 front-end systems.

– – –

Data Disc, Inc. has established a direct European sales/sales support organization with an office in Offenbach/Main, West Germany.

– – –

Data Card Corp. has established a subsidiary company, Canadian Data Card Ltd., to be headquartered in Toronto.

– – –

Computer Automation, Inc. has delivered its 5,000th minicomputer, to Union Carbide Corp., for use in an automated laboratory system.

Market Division Possible

WU Objects to IBM Satellite Venture

By Molly Upton
Of the CW Staff

MAHWAH, N.J. – Western Union Corp. has opposed IBM's venture into the satellite communications field in a filing with the Federal Communications Commission.

The filing asks the commission to extend from Aug. 15 to Nov. 13 the deadline for filing responses to the IBM-Comsat proposal [CW, July 10].

Under the proposed plan, IBM would assume 55% of CML Satellite Corp. with Comsat holding 45%, up from its current 35% share.

Western Union noted in its filing that the proposed joint venture of IBM and Comsat "raises antitrust and other policy issues of far-reaching scope" and that facts "may well establish that the combination of IBM and Comsat, as the leading companies in computer manufacture and satellite technology, will forge an imprenetrable barrier to any successful market entry by other parties."

The filing further raised the possibility of AT&T and IBM dividing the voice and data communications market.

A "duopoly market structure" could develop in which the market is "tacitly divided on a noncompetitive basis between IBM and AT&T," the filing suggested.

An IBM spokesman said, "Western Union's motion for extension of time – a copy of which IBM received last Tuesday – contains innuendos based on unfounded speculation and fails to recognize that the IBM/Comsat jointly owned satellite company will operate independently as an FCC-regulated communications carrier."

The petition suggests that IBM, through its link with Comsat, would have the "economic and technological power to render competing communications systems uneconomic or obsolete by controlling the interfacing of IBM computer equipment with the communications systems that are vital to the ability of the computer to transmit information," he added.

Western Union's principal objective in making the filing is to raise what "we think are very important issues and make sure they get the serious consideration at the FCC that we think they deserve," a WU spokesman said.

GSA Lists Models From 3d Party, Cuts Several Schedule Contracts

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The General Services Administation (GSA) has compiled and released a list of computer systems that must be obtained from third-party lessors, when available, before any government agency will be permitted to procure that equipment from the ADP Supply Contract.

According to GSA's list, systems presently available from third-party sources and thereby convered under GSA regulation E-32 include the following IBM machines: all System 370s, from models 115 through 195; almost all System 360s, from models 30 through 75, and older 1410 and 1401 series.

Univac machines on the list include the 1004,1106 through 1108, 9300 Series, 418 and 494 models.

For Honeywell, that equipment includes the General Eelctric series from G415 through G635, the Honeywell 400 and 1250.

Control Data Corp. (CDC) models 6400 and 6600 also were found in third-party leasing inventories.

Conspicuously omitted were the Honeywell 4000 and 6000 series and all Burroughs equipment. Because these are absent from third-party inventories, these systems are exempt from this year's regulation.

Also exempt are all minicomputers under $50,000, according to George Dodson, GSA deputy commissioner for data processing, because "we felt it was more than we could manage."

Dodson explained that each lessor provided a one-time inventory, but equipment on that list was not necessarily sitting in a warehouse somewhere; the list merely furnishes information detailing what equipment the lessor can obtain for the government.

GSA followed up the survey by signing ADP Supply Schedule contracts with Control Data Corp., Univac, Honeywell, Digital Equipment Corp. and Burroughs which were, in every case except one, smaller than last year's contracts. GSA negotiations with IBM have not yet been completed.

CDC got the biggest share by far – an estimated $42 million, up from $35 million signed last year.

Honeywell signed for $20 million, down from $22 million last year.

Digital took a nosedive from last year's $16 million contract, signing for only $4 million for this year.

Burroughs signed for $2 million in ADP Schedule business, down from $5 million last year.

Specific Approvals

Export Bill Formalizes Procedures

By a CW Staff Writer

WASHINGTON, D.C. – An export licence requested by a U.S. vendor seeking approval to ship a computer to an Eastern Bloc nation could go as far as the President for approval, and then be blocked by a majority of both houses of Congress, if legislation introduced by Sen. Henry Jackson (D–Wash.) is made law.

The Export Control Law Extension Bill (S.3792), extending the life of the Export Control Law until June 30, 1977, has been approved by the Senate and sent to the House of Representatives for further action.

The bill would require the following approvals each time an export license is requested involving a Communist nation:

- The Commerce Department, which issues export licenses, would be required to alert the Pentagon that the request had been received.

- The Pentagon would then have 30 days to review the license application to determine if the item would "significantly increase" the military capability of the nation involved. If the Pentagon ascertained it would, officials there could deny the application.

- If the President felt the Pentagon's decision was a poor one, he would have the option of overruling the Pentagon and authorizing the license. It would then be his responsibility to notify Congress that the license would be issued.

The final safeguard permits Congress a review period of "30 continuous days" in which it can block the export by a majority vote in both house.

The bill formalizes what has been an informal relationship between the Department of Commerce and the Defense Department in granting export licenses.

According to Dan Cook, a Commerce Department spokesman, "the bill specifies Defense Department approval, rather than the prevailing requirement for approval from 'other concerned agencies.'

"Of course, the Defense Department is a concerned agency," he said, "and their approval is always requested."

The matter would get to the Congress "only if the Defense Department disapproves and the President overrides the Defense Secretary's recommendation," Cook explained. "So, in practice, I don't see that there will be much change."

The export licenses that might actually be decided by Congressional action probably would be dependent upon the general feeling in Congress at any given time – "whether they're concerned with trade promotion or with national security," according to Cook.

"A couple of years ago we were getting all kinds of amendments to liberalize trade, and this year, we're getting all kinds of amendments going the other way," he explained.

In addition to computer hardware, goods covered under the proposed legislation include machinery and computer software; any licenses or arrangements for use of patents, designs or plans; trade secrets, know-how or knowledge of any person, firm, corporation or other entity; aid in planning and joint ventures; and aid in developing manufacturing capability, including so-called turnkey products.

CIA Seeks Internal Bell Documents

LOS ANGELES – The Computer Industry Association (CIA) has asked the Federal Communications Commission to recognize it as a party to the commission's inquiry into AT&T pricing practices (Docket No. 19129).

If allowed to participate, the CIA will seek Bell System internal documents relevant to the production and sale of equipment which "has been and may be offered as a replacement for teletypewriter terminals . . ." such as the Dataspeed 40.

"The aim of the document request is to develop information concerning the basic elements of competition between, on the one hand, the regulated and unregulated elements of the American Telephone and Telegraph system and, on the other hand, the largely unregulated and competitive computer and terminal markets," the CIA stated.

"The request therefore identifies the major elements included in any production and marketing plan and the major factors involved in any subsidization, or cross-subsidization, of a product."

"The commission's proceeding is aimed at numerous issues concerning the appropriateness of AT&T accounting and pricing procedures in monopoly and competitive markets. The issue of cross-subsidy is an unavoidable part of such an inquiry," the petition added.

The request seeks information on marketing, service considerations, pricing and costs, including "compensation or reimbursement among organizational units or components of the AT&T system for costs incurred by organizational units or components of the AT&T system . . . "

'Core Will Be Around'

Cambridge Looking at Semis for Minis

By Molly Upton
Of the CW Staff

BEDFORD, Mass. – Cambridge Memories is investigating introducing semiconductor-based add-on memories for minicomputers, but core will definitely be around for quite a while, according to Bill Nimee, OEM market manager.

On a price basis, core is better than the 1K semi, with the added feature of nonvolatility, which is a consideration in some applications, he noted.

Semis have the advantage of speed, but often the speed is limited by the CPU's capabilities, Nimee added.

Cambridge expects to be producing semiconductor memories in its second quarter, November to January.

Nimee predicts higher packaging density will come, not only with semis but also with core. He noted that Cambridge now packs 16K on the same card size as it used to put 4K.

"Core pricing has bottomed out," he said. "It came down aggressively, but two things are happening. Core efficiencies are still improving, but, inflation is working against it," he said.

The only thing that will make semiconductor prices come down is if the 4K devices come out in abundance.

The mini market continues to grow and the demand for core, even from end users, is linked in a chicken or the egg type pattern.

Independent core helps lower the total system cost of minis, thus opening up new markets for minis where they may not have been previously justified on a cost basis.

Also, users with minis are discovering that they can get "almost twice as much core for the same cost and thus can enjoy some of the comforts of not being core constrained.

"Add-ons are giving the programmers much more room to operate, and a chance to use software that was too expensive before," he said.

Nimee noted that mini suppliers are attempting to tie in the sale of their native core with their machines and even their software.

"It's a policy that we're not surprised at, because if we were making minicomputers we'd probably do the same thing."

As a rule, mini suppliers require users to buy a minimum amount of native core and in several cases require the purchase of all core required by certain software packages, he said.

"We just offer features and prices that are very attractive to the user. If they have to use a certain amount of manufacturer core, great, we'll add on top of that," Nimee said. "Or if the company will sell computers without that much memory, great, we'll sell whatever the user can take.

"But since there has been such an active marketplace, there has been enough core requirement to make the business useful to us," he said.

Mini manufacturers generally won't refuse to service units with add-on memories, he said.

Bunker Ramo Relocates Telecenter DP Complex

TRUMBULL, Conn. – Bunker Ramo is relocating its New York City Telecenter DP complex to Trumbull, site of the Nasdaq data center.

Telecenter supplies quotations and other market data from 25 major stock, bond and commodity exchanges to over 2,400 brokerage offices and financial institutions.

The firm is also establishing an auxiliary center in Manhattan to serve as a distribution point for interim and closing market reports from all exchanges.

CDC Founder Seeks Minn. Governor Post

MINNEAPOLIS – A founder of Control Data Corp., James Miles, is running as an independent for governor of Minnesota. His wife is his running mate for the post of lieutenant governor.

Miles has been walking across the state to publicize his candidacy. He resigned from CDC earlier this year to campaign.

Orders & Installations

Blue Cross of Massachusetts, Inc. has purchased a Honeywell dual processor Model 66/60 for installation during the fourth quarter of this year. The series 60 will handle the firm's general system applications..

Systems Engineering Laboratories, Inc. has received over $2 million in orders from the Power Systems Group of Combustion Engineering, Inc., Windsor, Conn. Included are orders for two more Systems 85 computers and associated equipment to be used to monitor nuclear power plant performance at an electric utility installation.

W.T. Grant Co. has ordered Sweda 700 System point-of-sale terminals and in-store computers from Litton Industries for 22 stores.

Scientific Time Sharing Corp. has purchased its second IBM 370/158.

The Atomic Energy Commission's headquarters computer center has ordered a CC-70 communications processor system from Computer Communications, Inc. to serve as the controller between the center's IBM 370/165 and 360/50 computers and all remote terminals.

A powerful, productive
Key-to-card
Data entry
System.

Tab
Punch/Verifi

DG Eyes Supermarket Arena, Tests POS Unit

By Molly Upton
Of the CW Staff

STOUGHTON, Mass. – Data General Corp. is eyeing the supermarket point-of-sale market and has installed a nine-terminal system at a Brockton Public Markets (BPM) store here in an engineering test of its proposed system.

The system features a hand-held wand made by Data General that reads both the Universal Product Code (UPC) and Data General's Tribar code. Labels coded in Tribar are printed and attached to merchandise by a portable labeler developed by Dymo Industries for Data General.

The terminals have a 20-character display screen for customers, enabling them to identify the item being scanned and its price, as well as a price and code display for the clerk.

Dual processor Novas in the store, for which the software provides backup recovery, are linked to the terminals. A CRT and line printer are also included.

Both the keyboard and the software, which contains five data bases, were designed to BPM's needs.

The supermarket area appeals to Data General because it is a highly concentrated, easily identifiable market, and Data General makes a high percentage of the components in the supermarket system, explained Larry Seligman, manager of systems development.

The Novas are a standard item, he said, although the software is new, and Data General also makes most of the components in the terminal.

Both Data General President Edson D. de Castro and BPM President Stanton W. Davis emphasized the installation is a learning experience for their firms.

Although only about 300 of BPM's 8,000 items arrive with the UPC imprinted on the package, Davis noted these are the principal high-volume items.

BPM uses the Data General hand labeler to mark other items in the store to avoid a mixture of scanning and hand keying.

Customer acceptance of scannable prices, which Davis anticipates will arrive when scanning is widely practiced by supermarkets, is a critical practice. Davis noted BPM will continue to label each item with a price that is understandable to the consumer, even though labeling costs have doubled or tripled.

Davis said customer acceptance of the system, which has been demonstrated for some time, has been good. One shopper was "tickled" with the detailed receipt, which prints up to 15 alphabetic characters and the price.

BPM clerk uses hand-held Data General scanner.

Davis also expects customers will appreciate the accuracy of the system.

BPM expects the management information system will enable it to improve its merchandising and keep closer tabs on inventory.

BPM is replacing all nine of its cash registers with nine terminals and will evaluate the feasibility of cutting the number of checkout stations.

ROYAL PUDDING	.23
DOLE PINEAPPLE	.36
FRANCO AMERICAN	.24
MAXWELL COFFEE	1.09
MINUTE RICE	.42
BISQUICK	.93
HI-C ORANGE	.41
TETLEY TEA BAGS	.79
TOPCO SOAP	.51
GR. GIANT PEAS	.18
BAKED BEANS	.41
HUNTS TOMATOES	.43
FOOD CLUB PEAS	.31
TOPFROST CORN	.60
HEINZ CARROTS	.15

Itemized Register Receipt

Tab's new Punch/Verifier provides a sophisticated electronic key entry system utilizing the flexibility, simplicity and low-cost of punch cards. Hundreds of data processing installations have switched to Tab's Punch/Verifier with dramatic results.

029, 059 users – Reporting 20 to 40 percent increases in throughput with no complex system changes, no lengthy learning process for operators.

Buffered keypunch users – Reporting greater operator speed and efficiency with Tab's exclusive features such as: Automatic Program Sequencing! Automatic punching of up to 240 characters of repetitive data! Automatic Error Correction!

Other data Entry Methods – Tab's Punch/Verifier has the built-in advantages of the more costly and complicated key-to-disk, key-to-tape and direct entry systems. Designed for maximum operator comfort and efficiency, the Punch/Verifier optimizes the skills and techniques of your present keypunch operators.

Now available in most cities. Call your local Tab office for a demonstration. The performance features of the Tab Punch/Verifier will quickly convince you that this is truly the best of everything in data entry systems. Tab Products Company, 2690 Hanover Street, Palo Alto, California 94304. 415-493-5790.

TAB
PRODUCTS CO

er

TBI Decentralizes

ANAHEIM, Calif. – In its first step into a new market, California Computer Products Inc. (Calcomp), has agreed to acquire the Braegen Corp. for an undisclosed amount of Calcomp common stock.

Calcomp has been looking for the best way to break into the communications market for the past two years, according to a Calcomp spokesman, and weighed the possibilities of marketing someone else's equipment, developing its own or acquiring a firm which already had the technology.

"Calcomp feels that Braegen has the smartest terminal around," the spokesman said.

The Braegen B-40 terminal is designed to replace the controller in an IBM 3270, 3780 or 2780. The firm also manufactures the B-3 keyboard-to-CRT box.

Braegen will continue to operate under its present name, but as a wholly-owned subsidiary of Calcomp, "and we will sell the terminal as a Calcomp product eventually, the spokesman said.

Calcomp Gains Braegen

ELMSFORD, N.Y. – Time Brokers, Inc. (TBI) has decentralized its operations in the time-for-sale market by converting its network of local sales offices into independent companies owned and managed by branch managers.

All other activities of TBI, such as marketing of used computers, third-party leasing brokerage and publication of a price guide on used computers' will continue to be handled at headquarters.

LEASE OR SALE
CDC 6600
AVAILABLE OCTOBER 1974
• 65.5 WORDS STORAGE
• (2) 6638 DISC SYSTEMS
• CARD READER & PUNCH
• LINE PRINTER
BOOTHE COMPUTER - DON BELL - (415) 989-6580

UK Service Revenues Hit $247 Million

LONDON – Revenues of the services industry in the UK reached $247 million, an increase of 30% over the 1972 figures, according to *EDP Europa Report.*

A hefty rise in the remote access sector more than compensated for the slight decline in the time-for-sale area and played a large part in the industry's rise in revenues to $247 million compared with $190.4 million last year.

Revenues for the remote access business jumped to $26.1 million from $13.6 million in 1972, according to the report.

Remote access business done for nongovernmental clients doubled to $16.4 million from $8.2 million last year, while foreign client business soared to $446,930 from $212,710 a year ago.

International News

Time-for-Sale

Revenues in the time-for-sale sector declined slightly to $12.2 million from almost $12.4 million in 1972, with a reduction in revenue volume occurring in the government sector and business with parent/associates.

Revenue growth occurred in the other areas of the services industry, such as custom-built programs and package programs.

Under the heading of professional services, volume of revenue grew in the three areas of programs, consultancy and data preparation, according to the report.

Custom-built program revenues grew to $34.7 million from $29 million in 1972, while package programs rose to $29.2 million from $26 million a year ago.

The report noted that at least part of the total increase in industry revenues was due to reorganization within the industry. The data was obtained from Business Monitor SD9, June 1974.

Japanese Nix Punch Equipment

From Shukan Computer
Special to Computerworld

TOKYO – Prompted by increasing costs of cards and labor shortages, users here are advancing their plans to install key-to-disk or key-to-tape systems as keypunch replacements.

About 5,000 key-to-tape units are believed to be in operation now, even though the shortage of operators is significant.

Mohawk Data Sciences and Honeywell Information systems are believed to account for a little less than 70% of the total key-to-tape installations. The three domestic firms, Teac, Oki and Rikoh are said to account for 10% to 20% of the units.

In addition, Inforex and Toyo Officemation recently began a positive sales offensive in this area so price competition is intensifying.

800 Bit/In. Tape

Although users are switching from 800 bit/in. magnetic tape to 1,600 bit/in., key-to-tape continues to remain at 800 bit/in. This failure to change is influenced more by cost than by technical problems.

Not too much growth is seen in the key-to-cassette field, but it is believed it will become useful as a data collector and transactor.

The overall assessment is that OCR will ultimately become the main input device, but there are still cost and performance problems, and the appraisals of available equipment seem to be varied.

Want to pamper your printer with a banquet sized supply of continuous forms? Or whet its appetite with 250—fast?

Either way you can depend on Curtis 1000 continuous forms to run smoothly and cause no trouble. Quality? It has been our hallmark for over ninety years. Service? We supply you, economically, direct from regional facilities.

Heard about our Envo-Mailer continuous self-mailers? These form-and-envelope combinations eliminate collating, inserting, sealing, and metering. They are available in almost any combination of envelopes, forms, and special inserts. And we can give you immediate delivery on blank Envo-Mailers.

Ask your local Curtis One Thousander for samples. Or write to Jack Holloman, Vice President-Marketing, Curtis 1000 (Reference CW-CF), 1000 Curtis Drive, Smyrna, Georgia 30080.

Curtis 1000 supplies continuous forms and hundreds of other products through over four hundred full-time, local-area, systems-oriented product specialists.

Curtis 1000
Business Forms, Envelopes, Supplies

Our fast forms service satisfies your printer's gourmet appetite and causes no distress

Curtis 1000
is a member of the
American Business Products
family of companies
and is the principal national
marketing arm of ABP.

PEOPLE
WHO NEED PEOPLE
NEED US . . .
If you need a programmer or want to be one, why not call or write us?
If we're not the best private data processing school in the country, then we would like to know who is.
COLEMAN COLLEGE
"THE PEOPLE SOLVERS"
2425 San Diego Avenue
San Diego, Calif.
(714) 291-8111

NAME_____
COMPANY_____
ADDRESS_____
CITY, STATE_____

Canada Forecasts Communications, DP Expenditures of $85 Million in '74

Special to Computerworld

OTTAWA, Ont. – Expenditures for DP products and services by the various departments of the Canadian Federal Government are expected to reach $85 million this year, up 41% over last year, according to a general forecast presented here recently by the Federal Department of Supply and Services.

Expenditures for DP and communications equipment during 1973 and 1974 amounted to nearly $60 million.

While the 1973-74 expenditures in systems of more than $1 million involved eight contracts worth $33.2 million, the forecasts for 1974-75 see a doubling of large system requirements to 17 contracts worth about $53.7 million.

The number of contacts anticipated in the $200,000 to $1 million range is expected to remain unchanged, but the value of the anticipated 25 contracts is expected to reach $10.5 million in 1975. The previous year's 25 contracts were valued at $7.9 million.

Government officials stressed the forecast was provided for planning purposes and is not to be construed as a commitment to acquire or procure equipment or services.

Several departments, however, are anticipating installing new equipment. Statistics Canada, the nation's census-taker, intends to upgrade its IBM 370/165 this year. Further upgrading, or possible replacement, is expected just prior to the 1976 census.

Revenue Canada, the tax department, intends to upgrade the facilities of its centeral communications site and expects to replace its computing facilities for ongoing tax processing operation by 1980.

The Departments of External Affairs, the Post Office, Environment Canada and National Defense all plan to establish new data centers. External Affairs will seek bids in 1975-76 for a records management system to aid its foreign service officers.

Environment is studying the need for a medium-scale general-purpose computer for its West Coast operation, and National Defense plans to add a third data center to its existing operation.

The Post Office is still in the early stages of configuring an information management system.

The ministry of Transport, one of the largest users of DP systems, is supervising the design and construction of a system for the earth terminal that will work with the proposed aeronautical communications satellite (Aerosat) as part of its assignment to control air traffic over the North Atlantic.

Another $1 million is expected to be spent on upgrading the Gander automated air traffic sysem in 1978-79, and another million to improve its interim flight data processing system in 1977-78.

International News

International Briefs

IBM Japan has made its initial shipments of the System 370/115 to overseas markets. The first five systems will be shipped to Brazil, El Salvador and Australia, according to *EDP Japan Report.* The company expects to begin shipments to domestic users in the near future.

* * *

Ten Japanese computer equipment trading firms have established conference meetings once every two months to improve and consolidate their position in importing and marketing activities in the Japanese market. By meeting regularly, member companies hope to avoid excessive competition among themselves in importing and marketing foreign-made computer equipment, according to *EDP Japan Report.*

Foreign Orders & Installations

Canadian Electric Co., Ontario, has ordered a factory data collection system from the Data Systems Division of Sierra Research Corp.

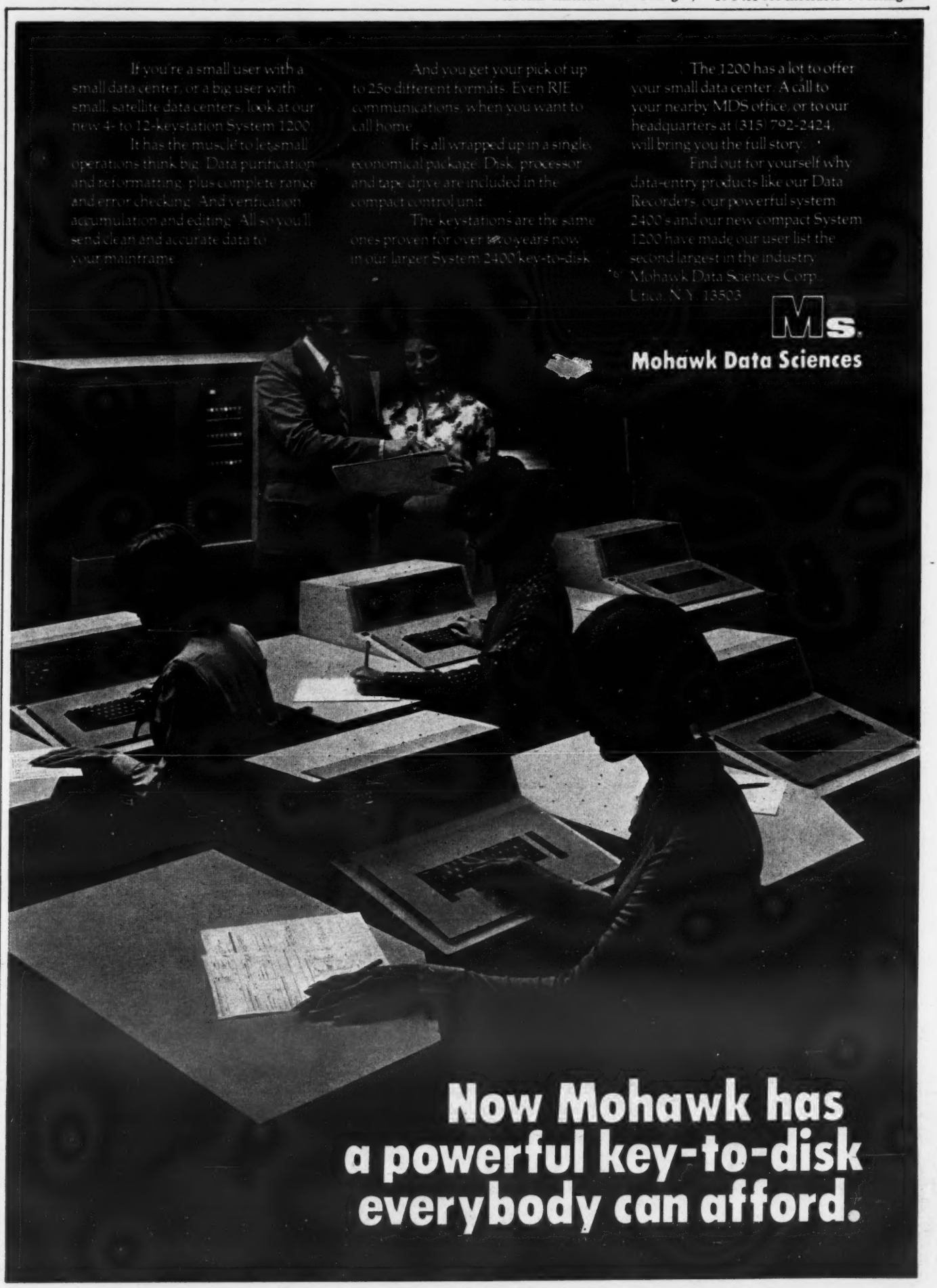
Tiroler Gebietskrankenkasse fur Arbeiter und Angestellte, the regional health insurance organization in the Tyrol province of Austria, has ordered a Univac 9480 to expand its present Univac 9400 into a double system.

Concorde-Lafayette, a Parisian hotel, has ordered an NCR Centry 100 to process management data and handle all accounting for the Concorde chain.

Victoria Institute of Colleges, Australia, has installed a Control Data Cyber 72 system to serve as the nucleus of a computer network which will eventually link 12 colleges.

Guinness Mahom & Co., an English banking firm, has ordered an NCR Century 251 to provide on-line information services to dealers and settlement clerks in the money, foreign exchange and premium dollar dealing rooms.

Sussex University, England, has ordered a Modular One system from Computer Technology Ltd. which will be linked to an ICL 1904A for interactive editing.


If you're a small user with a small data center, or a big user with small, satellite data centers, look at our new 4- to 12-keystation System 1200.
It has the muscle to let small operations think big. Data purification and reformatting, plus complete range and error checking. And verification, accumulation and editing. All so you'll send clean and accurate data to your mainframe.
And you get your pick of up to 256 different formats. Even RJE communications, when you want to call home.
It's all wrapped up in a single, economical package. Disk, processor and tape drive are included in the compact control unit.
The keystations are the same ones proven for over two years now in our larger System 2400 key-to-disk.
The 1200 has a lot to offer your small data center. A call to your nearby MDS office, or to our headquarters at (315) 792-2424, will bring you the full story.
Find out for yourself why data-entry products like our Data Recorders, our powerful system 2400's and our new compact System 1200 have made our user list the second largest in the industry.
Mohawk Data Sciences Corp.
Utica, N.Y. 13503
Ms.
Mohawk Data Sciences
Now Mohawk has a powerful key-to-disk everybody can afford.

Litton Upgrades Model 30 Serial Printer

PINE BROOK, N.J. – Litton's OEM Products Division is offering an upgraded version of its Model 30 asynchronous serial printer, the Mark II, and a new paper tape reader/punch.

The Mark II printer features programmable read-only memory (Prom) capability and is designed to provide forms flexibility, the firm said.

Standard features include split platen, tractor feed for continuous forms, friction feed for roll paper and adjustable pin feed tractors. Like its predecessor, the printer produces an original and five copies and operates at 30 char./sec. It sells for $1,498 in single units, with quantity prices available.

The Roytron Series 1560 paper tape reader/punch features a 150 char./sec photoelectric reader along with a 60 char./sec Roytron punch. The unit can punch and read metallized mylar, sandwich paper, color and standard 5-, 6-, 7- or 8-level paper tape in widths of 1 in., 7/8 in. or 11/16 in., the firm said.

The unit contains its own power supply and is priced under $2,200 in single units, with discounts available. Delivery is 60 days from 34 Maple Ave., 07058.

OEM Products

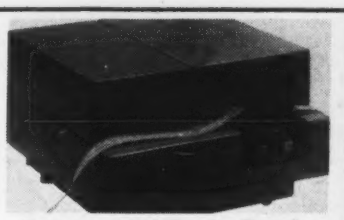
MDS Unveils Small Printer

UTICA, N.Y. – The 2090 microprinter from Mohawk Data Sciences Corp., designed to sell for less than $50 in large OEM quantities, is intended for use in small business machine applications, including point-of-sale and remote terminal printing.

Print quality is said to compare favorably with larger and more expensive mechanisms.

The 2090 includes a single print hammer for each three print columns and operates up to 3 line/sec.

Other design features include



Roytron 1560 Reader/Punch

an ac motor and a snap-in ribbon cartridge.

The standard 15 numeric columns are expandable on request to further columns or to alphanumeric. A preproduction Model 2090 was shown at the National Computer Conference.

Delivery is 90 days from Box 362, 13503.

Display Has Two Modes

VAN NUYS, Calif. – Field effect liquid crystal digital read-outs suitable for portable or battery powered units where package density and power consumption are design considerations are available from Industrial Electronic Engineers, Inc.

MDS Microprinter

The units are available in reflective – Model 1650-01 – and transmittive – Model 1550-01 P or N – configurations.

Prototypes are available at $21.30 each in quantities of 100, which includes connector and printed circuit board, from 7720-40 Lemona Ave., 91405.

Other New Products

Fairchild Camera & Instrument Corp. is offering three additional models of its Isoplanar random access memories (RAM) in plastic packaged versions: the 93415 TTL 1K RAM, the 93411 TTL 256 by 1 bit, and the 93421 TTL 256 by 1 bit. the 93415 costs $22 in 100 lots; the others cost $12.40 from 464 Ellis St., Mountain View, Calif. 94042.

– – –

Micro Systems, Inc.'s 500 Series of logic circuit testers consists of portable, programmable units which sell from $5,950 to $11,950 and feature a microprogrammed test processor. Micro Systems is at 2106 W. Peoria Ave., Phoenix, Ariz. 85029.

– – –

Hughes Aircraft Co. Industrial Products Division offers a printed circuit (PC) board repair station, the Model HPC-500, that welds Kovar flat-pack leads to copper PC boards, enabling manufacturers to salvage boards that previously would have been scrapped, the firm said. The HPC sells for $3,575 from 2020 Oceanside Blvd., Oceanside, Calif. 92054.

We'll have a hallfull of companies at the 1975 Computer Caravan.

Almost all of the available space at the 1975 Computer Caravan has already been spoken for by a wide variety of leading computer companies. So our travelling computer users' forum and exposition will be displaying almost every aspect of complete computer systems in one, uncrowded exhibit hall.

With leading companies like these, the 75 Caravan will be bigger and better than ever:

Control Data Corporation
Computer Devices, Inc.
Pansophic Systems, Inc.
Cullinane Corporation
Wang Laboratories
Data General Corporation
Digital Equipment Corporation
Incoterm Corporation
Sycor, Inc.
Prime Computer, Inc.
Raytheon Data Systems
Raytheon Service Company
Inforex, Inc.
Edutronics Systems Int'l
Mohawk Data Sciences
BASF Systems Inc.
Cummins Allison Corp.
Gould Inc. Instruments Systems Div.
N.C.R.
Cambridge Memories, Inc.
Software International
Consolidated Computer, Ltd.
3M Company, Microfilm Prod. Div.
On-Line Systems, Inc.
Cooke Engineering Company
Boeing Computer Services
Delta Data Systems
Modular Computer Systems, Inc.
Scan-Data Corporation
Penril Data Communications, Inc.
Scope Data, Inc.
Panasonic/Matsushita Electric Corp. of America
Interdata, Inc.
Quantex, Inc.
Precision Methods, Inc.
A T&T Company
Cincinnati Milacron, Process Control Div.
Digital Computer Controls
Potter Instruments Co., Inc.
Tesdata
Mini-Computer Systems, Inc.
Software AG
Scientific Measurement Systems
Software Sciences Corp.
Datatype Corporation
G.T.&E. Information Systems
Auerbach Publishers, Inc.
Infotron Systems
Lockheed Electronics Company, Inc.
General Computer Systems
California Computer Products
General Automation
Pertec
Varian Data Machines
Texas Instruments, Inc.
Electronic Memories & Magnetics Corp.
Stromberg DatagraphiX, Inc.
MSI Data Corporation
Courier Terminal System
Pacific Micronetics
Omnitec Corporation
Decision, Inc.
Omron Systems, Inc.
Quantor Corporation
Tab Products Co.
Beehive Terminals
Hewlett Packard
Tri Data
Tektronix, Inc.
Datapoint Corporation
International Communications Corp., a Milgo Company
Bell and Howell
Periphonics Corp.
The Computer Software Company
Southern/Pacific Communications Company
Program Products, Inc.
Anderson Jacobson, Inc.

If you're marketing products or services in the computer industry and would like to be part of The '75 Caravan, we're still accepting reservations for the limited space available. Call Neal Wilder or Dottie Travis at (617) 965-5800 for all the details.

The Computer Caravan/75

Sponsored by

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

IBM 370's

are CSA's only business.

CSA is a computer leasing company, and can help you meet your present and future equipment needs with substantial savings.

For further information, please call: (617) 482-4671

Computer Systems of America, Inc.

a computer equipment leasing company:
141 Milk St. Boston, Mass. 02109

Send for the 12 questions you should ask of any leasing company before you lease.

Name_____
Title_____
Company_____
Address_____
City_____
State_____ Zip_____
370 on order ☐ installed ☐
Model_____ Due Date_____

If this issue were yours, you could read it over tea instead of someone's shoulder.

order your own subscription

Please send me **COMPUTERWORLD** *for 1 year* RATES: U.S. - $12 Canada - $13 Other foreign - $36

☐ Check Enclosed

☐ Charge My American Express Account: If charge we must have cardholder's signature:

First Initial		Middle Initial		Surname
Your Title				August 21, 1974
Company Name				
Send to: Address				
City			State	Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld.*

COMPUTERWORLD

CIRCULATION DEPT. 797 Washington Street, Newton, Mass. 02160

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY
10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/ Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/ Other Communication Service
95 Other: _____

TITLE/OCCUPATION/FUNCTION
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other: _____

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

S-Cubed Seeks Code to 'Earthly Matters'

LA JOLLA, Calif. – Development of a two-dimensional nonlinear computer code for studying aspects of the use of underground resources will be underway here soon at Systems, Science and Software (S-cubed).

The new nonlinear code is expected to allow for more detailed, accurate analyses of how gravity affects fluid flow and how faulting forces interact with fluids.

S-cubed will perform exploratory calculation on effects such as settling of the earth's surface as a result of extracting hot water from the natural underground reservoirs.

The firm will also study the relationship between increases in seismic activity and the underground wells.

The project was subcontracted by the University of Colorado under a grant from the National Science Foundation.

Optimum Systems, Inc. has received a three-year service contract from the City of Sunnyvale, Calif.

National Sharedata Corp. has been awarded a five-year, $4 million contract by First National Bank and Trust Co. of Evanston to direct operations for the bank's DP facility and market automated services to other banks and businesses in the area.

General Electric Co. Space Division's ground systems department has received a contract from the Naval Training Equipment Center. The contract, valued in excess of $4 million, is for a production prototype computer-generated image visual system and supporting data.

University Computing Co. (UCC) has received a contract from the U.S. Geological Survey to map the earth's magnetic field in Alaska. UCC will record and digitally process more than 11,000 miles of aeromagnetic data

TRW Data Systems has been awarded a contract by Playboy Clubs International, Inc. for its Validata Service.

Planning Research Corp. has received a contract from the Federal Power Commission to develop and operate a fully automated regulatory information system.

Interdata, Inc. has been awarded a contract by Diversified Data Systems, Inc. for Model 7/16, 70 and 74 computers which will be used in Interdata's business data processing systems.

Contracts

Computer Sciences Corp. has received a consulting contract from Taiwan Power Co. for the development of an automated on-line dispatch and control system.

Boeing Computer Services Corp. has been awarded a contract by the Air Force Systems Command to furnish and install DP equipment software for computer performance evaluation and management information systems.

Bunker Ramo's Electronic Systems Division has been awarded a contract by the Port of New York/New Jersey Authority to develop and install an automated pool vehicle dispatching system at the World Trade Center in New York City.

It Wasn't a Hard Choice

OCEANPORT, N.J. – Peter L. Overmire, vice-president of Wellsco Data Corp., had little trouble choosing his prize when he won an advertising design contest sponsored by Interdata.

The minimaker offered a choice of $1,000 or a tour through its plant. Overmire collected the green stuff.

A veteran of two decades of data processing, Overmire won an official Orphan Annie decoder ring back in the days when he was working on an IBM 650. He also confessed that he was lucky with cereal boxtops.

Wellsco Data Corp. is a subsidiary of the Wells Fargo Corp. and studies automated banking applications, such as electronic funds transfer systems.

The contest was sponsored by Interdata in conjunction with The Computer Caravan. Overmire's ad for Interdata will appear soon.

Position Announcements

NEEDED:
EXPERIENCED SALESMEN

To market computer peripherals, time-sharing, on-line services, leasing agreements, software, minis, and other data processing services. Positions are available nationwide. All positions are fee paid.

Call ROB DAVIDSON
at (215) 643-5550
or send resume to:
RSVP SERVICES DEPT. CW
Suite 104 Towle Bldg.
1777 Walton Road
Blue Bell, Penna. 19422
Employment Agency for Computer Professionals

Programmer

We have position for multifaceted individual. DOS, JCL, card/tape/disk batch environment. Must be proficient in RPG II, DOS multi programming. Systems background required. Los Angeles location. Liberal company benefits. Salary commensurate with experience. Send resume and salary history, in confidence, to:

CW Box 4188
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer

PROGRAMMER ANALYST SOFTWARE
HALLMARK CARDS

Hallmark Cards, the leader in its field, has an immediate need to fill a key Software Analyst position with CICS Project Responsibility. Successful candidate will have large scale IBM 360 or 370 background. Minimum two years OS plus CICS/VS experience. Basic Assembler Language with TP/Data Base and COBOL; OS/MVT or VS-2 HASP operating systems desirable. Paid relocation to Kansas City, Missouri. We offer an excellent salary, top fringe benefits, and a wealth of opportunity to the qualified individual.

For immediate consideration, please submit resume before Sept. 6, 1974, to: P.R. Malone, Professional Recruitment, Hallmark Cards, Inc., 25th & McGee, Kansas City, Missouri 64141
An Equal Opportunity Employer M/F

Computerworld Sales Offices

Vice President–Marketing: *Neal Wilder.* **Sales Administrator:** *Dottie Travis.* Computerworld, 797 Washington St., Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529.

Northern Regional Manager: *Robert Ziegel.* **Account Manager:** *Mike Burman.* Computerworld, 797 Washington St., Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529.

Eastern Regional Manager: *Donald E. Fagan.* **Account Manager:** *Frank Gallo.* Computerworld, 2125 Center Ave., Fort Lee, N.J. 07024. Phone: (201) 461-2575

Los Angeles Area: *Bob Byrne.* Robert Byrne & Assoc., 1541 Westwood Blvd., Los Angeles, Calif. 90024. Phone: (213) 477-4208.

San Francisco Area: *Bill Healey.* Thompson/Healey Assoc., 1111 Hearst Bldg., San Francisco, Calif. 94103. Phone: (415) 362-8547.

Japan: *Ken Suzuki.* General Manager, Dempa/Computerworld, 1-11-15 Higashi Gotanda, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: Japan-26792.

United Kingdom: *Colin Hanmore,* c/o IDC Europa Ltd., 140-146 Camden St., London NW1 9PF, England. Phone: (0l) 485-2248. Telex: UK-26-47-37.

West Germany: *Otmar Weber,* Computerworld GmbH, (8) Muenchen 90, Tegernseer Landstrasse 300, West Germany. Phone: (089) 690-70-52. Telex: Ger-52-81-08.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

TECHNICAL DATA PROCESSING
CAREER OPPORTUNITIES

Because our Technical Data Processing Group is principally engaged in the support of research and technical service laboratories in the fields of chemistry, engineering, and biology, subsidiary skills in one of these areas, or in mathematics or statistics, would be an asset. We are presently operating an IBM 1130- System/7 lashup and will convert to a DEC System 10 in the near future. Preference will be given to applicants familiar with these hardware environments.

SYSTEMS PROGRAMMER

Duties include the ability to maintain the various monitors, make and document any needed modifications, interface laboratory instruments and remote terminals to the computer, work cooperatively with manufacturers and vendors of hardware and software to carry out these duties.

APPLICATIONS PROGRAMMER-ANALYST

Requires the ability to (1) Work co-operatively with Users to evolve specifications for applications in the Scientific and Commercial Data Processing areas, (2) Write, Document, and Maintain FORTRAN and applications programs, and (3) Instruct Users in the applications of such programs, and Keypunchers and Machine Operators in the operational details.

NALCO

Send resume including educational background, work and earnings history in full confidence to:
Mr. Wm. Aschbrenner
Personnel Department
NALCO
6216 West 66th Place
Chicago, Illinois 60638
An Equal Opportunity Employer

MIS at Hooker

Openings of Interest with a Major Company Enjoying Strong Growth and Expansion

Hooker has long had an earned reputation for technological leadership – that carries over into management and systems areas. Serving a wide variety of industries, and expanding mainly from a research base, Hooker offers a strong foundation and favorable environment for your career progress.

INFORMATION SYSTEMS PROJECT MANAGER

Plan and direct development of a major business system, category of systems, or one or more remote data processing centers. Contribute to setting standards providing guidance in business systems. Bachelor or Master degree with heavy background in Accounting, Mathematics, Operations Research, Statistics. Experience, 7-10 or more years in project coordination, systems analysis and programming, including at least 1-3 years involving company structures and standards, is called for.

ANALYST/CHEMICAL ENGINEER

Plan, coordinate, and implement new engineering and scientific systems. MS, BS in CHE, IE or EE required, with heavy chemical background. Knowledge of programming languages is essential, with at least 2 years academic or industrial experience in solution of technical problems, FORTRAN, and statistics.

These positions are at our attractive headquarters facilities, in a region affording very desirable choice of living and many resources. Please send resume with salary history information, in confidence to Mr. Cleaven Royster.

Hooker Chemicals & Plastics Corp.
P.O. Box 728
Niagara Falls, New York 14302
An Equal Opportunity Employer M/F

hooker
Subsidiary of Occidental Petroleum Corporation

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROGRAMMER

Computer programmer for Billion dollar plus life insurance company. Home office located in pleasant South Dakota city in northeast lake region. Excellent educational systems, year-round family activites abound. Presently have a 360/22 and anticipate capacity expansion soon. Should have at least 3/4 years experience plus consolidated file conversion background. If interested, please call 1-800-843-9935, give our Action Recorder an outline of your background and when and where you can be reached. We'll call you to exchange more details.

PROGRAMMER

Our Data Processing Department has an opening for a person with a minimum of 2 years experience in original and maintenance programming for administrative applications. Knowledge of RPG and Cobal languages is required. PDP/10 and/or 360/20 experience preferred. Send resume to M.J. Enwright, Personnel Director.

BRANDEIS UNIVERSITY
415 South Street Waltham, Mass. 02154
An Affirmative Action Employer

DATA PROCESSING CONSULTANTS

Dallas office of growing international CPA firm (not Big 8) offers opportunity to join its Management Advisory Services group.

We are interested in aggressive data processing professionals with experience in designing and implementing financial applications. Experience in life insurance applications or small scale computers, such as System 3, is a plus. We will consider individuals with a minimum of three years data processing and accounting experience who enjoy working on a variety of assignments.

A Bachelor's degree is required and a CPA certificate is preferred. Ability to communicate, both orally and in writing is essential. We offer a challenging, professional working atmosphere, unlimited growth potential and rapid recognition of abilities. Reply in strictest confidence with resume and salary history to

CW Box 4194
797 Washington St.
Newton, Mass. 02160

Entry Level Positions in SYSTEMS MANAGEMENT to $25,000

(Chicago Location)

WE ARE a leading international organization of professional consultants. A policy of controlled growth based on the personal and professional development of individual staff members has resulted in an image of quality and professionalism. As a result, we have a record of continued and stable growth over a period of years.

If YOU ARE a data processing professional with significant "hands-on" experience in the implementation of computer systems to solve problems in business, industry or government, we offer an exceptional opportunity for personal advancement.

Our objective is to develop you into a strategic and tactical thinking businessman in 4-7 years who thinks of computers as a business tool rather than an end in itself.

Candidates should have 2-5 years of technical data processing and application experience. An MBA is also desirable but not mandatory.

Interested candidates should reply in confidence to:

CW Box 4192
797 Washington St.
Newton, Mass. 02160
an equal opportunity employer

MANAGEMENT SYSTEMS PROGRAMMERS/ANALYSTS

Join a systems development project team which will be utilizing the latest data base technology in the development of comprehensive management information systems.
Ideal living conditions in scenic Southern Indiana. Competitive salaries and benefits. For further information forward resume, including salary history, to:

Mr. Rich Macek
Professional Placement Office
Indiana University
201 N. Indiana
Bloomington, Indiana 47401
(An equal opportunity employer)

EDP Consultant

Supervisory level positions with rapidly expanding management consulting firm available to data processing professionals with prior analysis, project management, or consulting experience. These are professionally challenging positions offering outstanding opportunity for recognition, responsibility, career growth, and financial reward. Degree required, MBA preferred. Starting $16,000—$22,000. Reply in confidence to **Consultants, 915 Asylum Avenue, Hartford, Ct. 06105 or phone (203) 247-5258.**

EDP SUPERVISOR

City of Fort Collins, Colorado (pop. 54,000). Starting salary to $17,112. University City seeking a responsible individual to head the EDP division of General Administrative Services Department. Unique opportunity to develop an integrated management information systems utilizing Digital Equipment Corporation PDP-10 time-sharing computer. Current applications include financial and utility billings, police reporting, engineering and personnel programs (COBAL).

Requires degree in Computer Science, Public Administration or related field. Five years' progressively responsible EDP experience including minimum of two years in supervisory or administrative position. Apply by September 15 to

Personnel Office
P.O. Box 580
Fort Collins, Colorado 80521

ATLANTA DALLAS
NEW ORLEANS HOUSTON
LOS ANGELES & OTHERS

Our National firm has several client listings for sales and systems professionals with 3 or more years exposure. Industries include:

Banking Insurance
Engineering Manufacturing
EDP & Services Oil & Chemical

Call or write in strictest confidence **W.D. Taylor –**
Suite 540, 1200 Milam
Houston, Texas
(713) 229-9686

HOWARD associates
don HOWARD Personnel Inc

SYSTEMS ANALYST PROGRAMMER

Small & fast growing Corp. needs individual with experience in systems & NCR 399 programming.
Salary-2-300 a week. Work only 3 weeks a month with 1 week paid vacation a month.
Forward resume including salary history to:

Doniee J. Hemstreet
Computer Development Inc.
833 Main St. Suite B
Milwaukie, Oregon 97222

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

PROGRAMMERS

Plan For Your Future...

. . . at Crum and Forster, one of the nation's foremost Property/Casualty Organizations . . . where careers are made. These positions are in our new modern corporate headquarters located ine one of New Jersey's most accessible suburbs.

We now have immediate openings in our rapidly expanding Data Processing Departments. To qualify you must have:

- **A minimum of 1-2 years' experience with ANS COBOL**
- **Exposure to IBM OS**
- **Insurance background an asset**

You will be working in a challenging environment geared toward your future development. We offer a very comprehensive beneifts program, salary commensurate with experience.

For appointment, call (201) 285-7575; or send resume and salary requirements to:

CRUM & FORSTER INSURANCE COMPANIES
P.O. Box 2387, Morristown, N.J. 07960
Equal Opportunity Employer M/F

COMPUTER PROFESSIONALS

Participate in the installation of a major Honeywell 6000 series computer system.

Opportunity in the San Francisco Bay Area for:
OPERATIONS MANAGER, to assume complete responsibility for the operation of a corporate computer center involving a sophisticated communications environment.
SYSTEMS ANALYST, to design, develop, and implement support operating systems, utilizing BOMP and MRP.
CHIEF PROGRAMMER, to provide programming leadership and guidance to the corporate-wide programming staff, utilizing COBOL language.

Opportunities also in Houston and Beaumont, Texas for:
SYSTEMS ANALYSTS, to participate in the total installation from a major telecommunications location.

Your background ideally would be from a major engineering/manufacturing, heavy metal-working environment, with Honeywell or GE systems installation experience in systems, programming, and operations.

Please forward detailed resume, including current compensation, in complete confidence.

Professional Recruiting
The Rucker Company
1330 Broadway
Oakland, California 94612

An Equal Opportunity Employer

RUCKER

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Expanding urban community college needs

DIRECTOR OF COMPUTER SERVICES

to plan, coordinate, and execute program of unified data processing services. Bachelor's Degree with five years experience including systems analysis and design, programming (at least 1 year COBOL) and 3 years supervisory experience. Salary: $20,277 plus fully paid family fringes including hospital, drug, dental, optical, life and disability insurance as well as free family tuition.

APPLY AT
WAYNE COUNTY COMMUNITY COLLEGE
4612 Woodward Avenue
Detroit, Michigan 48201

EDP is the very life of our business, and

- SYSTEMS SOFTWARE SPECIALISTS
- SYSTEMS PROGRAMMERS
- SENIOR SYSTEMS ANALYSTS
- PROGRAMMERS

get special consideration in everything that makes careers worthwhile.

Constantly increasing demands continue to provide challenges in our advance computer system consisting of 370/158, 360/65 VS 2 Release 1.6 using CICS and TSO systems.

We are an expanding nationwide organization, financed and supported by the insurance industry, consisting of 5,000 employees with offices in 39 states. Our Home Office is headquartered in New York. The EDP Center consists of 400 employees and within one (1) year will be relocating to the World Trade Center.

Immediate openings in NYC for qualified professionals to apply and broaden their knowledge, utilize their skills and keep abreast of the state-of-the-art.

SYSTEMS SOFTWARE SPECIALISTS
Opportunity for independent responsibility and decision making. Requires 4 or more years experience and demonstrated progressive responsibility in OS TSO internals. HASP and VS1/VS2 experience a plus. Salary to upper teens.

SYSTEMS PROGRAMMERS (Senior & Intermediate)
Candidates must have experience with OS/VS2 or OS/MVT; or a strong background in TSO and CICS; 3 to 4 years experience for senior positions; minimum of 18 months for intermediate positions. Salaries open.

SENIOR SYSTEMS ANALYSTS
Must have at least 2 years programming experience in ANS COBOL, plus 3 to 5 years analysis experience; preferably on commercial applications. Salary to upper teens.

PROGRAMMERS (Senior & Intermediate)
Candidates must have programming experience in ANS COBOL; 3 to 4 years experience for senior positions; minimum of 18 months for intermediate positions. Degree helpful. Salaries open.

To investigate these opportunities, please forward your resume with salary history and requirements to:

Miss Pat A. Gimenez

INSURANCE SERVICES OFFICE
160 Water Street
New York, New York 10038

An equal opportunity employer, m/f

DATA PROCESSING DIRECTOR

Immediate opening for Director of Data Processing in large Educational Institution in Washington D.C. area. Ability to manage a 360/30 DOS installation including supervision of operators and systems programming personnel. Plans, develops and modifies new administrative system for implementing on 370/145 OS/VS. We require a degree in a related field, minimum three years experience in systems analysis plus three to five years experience in data processing management, including operations.

Our excellent benefits include Educational benefits for eligible employee and spouse.

Please submit resume in confidence to

CW Box 4191
797 Washington St.
Newton, Mass. 02160
including salary requirement.

An Equal Opportunity Employer

MANAGER OF SYSTEMS & PROGRAMMING
HEALTH SCIENCES COMPUTING CENTER

University of Louisville Health Sciences Computing Center is looking for an experienced Systems Analyst and technical programmer to head up our programming staff. Applications include Patient History, Student Records, Financial Ledgers, Research Statistical Analysis in the Medical and Dental fields. Equipment includes a PDP 11/45 RSTS/E system on site and RJE to 370/165 and other large-scale computers. Salary range 12.5k to 14.5k. **Contact Larry Royse, University Personnel Services, 105 W. Brandeis, Louisville, Ky. 40208. (502) 636-6721.**

An Equal Opportunity Employer

---

computer

STATE OF ALASKA

Immediate openings in Juneau for:

SYSTEMS ANALYSTS

$1441—$1669 beginning salary

PROGRAMMERS

$1155—$1338 beginning salary

Required experience: IBM 360 or 370 DOS experience with COBOL in commercial or government application environment.

Send resume to Lois Benzel, Division of Personnel, Pouch C, Juneau, AK 99801

An Equal Opportunity Employer

PROGRAMMER/ANALYST

Experienced ANS COBOL Programmer to work with new Systems Application Group. Desirable candiate should have some manufacturing systems experience and be capable of assuming project responsibility. College Degree and/or CICS programming experience a plus. Company is installing a terminal network to an IBM 370/158 under OS/VS. Salary open and commensurate with experience.

Position located in historic Savannah with very desirable recreational and residential facilities.

Send resume in confidence to B.L. Butler

UNION CAMP CORPORATION
P.O. Box 570
Savannah, Georiga 31402
An Equal Opportunity Employer

Systems Analyst

University of South Dakota

Computer Center needs chief programmer to design and implement financial accounting systems in multi-campus environment. Must have degree in business administration, computer science or related field and 4 years progressively responsible experience in program analysis; knowledge of Cobol and in depth experience with VS/2-TSO or OS/MVT-TSO. Should have experience in educational institution and interpersonal communications skills to work with administrative systems applications.

Send resume or letter of inquiry to:
Patricia Gutzman, Personnel Director
University of South Dakota
Vermillion, South Dakota 57069.
An Equal Opportunity/Affirmative Action Employer

PROGRAMMERS:

COBOL

BAL

TELEPROCESSING

BANKING APPLICATIONS

COMMUNICATION NETWORK PLANNING

If you consider yourself proficient in any or all of the above areas, Kranzley & Co. is interested in discussing career opportunities with you. Please call collect or send resume including salary requirements in confidence to:

Robert Lane
Dept. 731
Kranzley & Co.
Cherry Hill, N.J. 08034
(609) 795-1515

HARDWARE SOFTWARE ANALYST

If you are interested in performing competitive evaluations in a research and planning environment and can work independently assessing company needs, exploring hardware/software products, analyzing their impact on the environment, and are able to clearly communicate your recommendations to management, then we have the career opportunity for you.

These positions require aggressive professionals with experience in one or more of the following areas:

- ☆ ,Nationwide teleprocessing networks
- ☆ IBM 370/168, 370/165, 360/65 equipment
- ☆ On-line data base applications
- ☆ OS/MVT/HASP/CICS/IMS systems
- ☆ Mini-computer and terminal market
- ☆ Systems programming

Excellent growth and career opportunity with the largest commercial installation in the Washington, D.C., metro area. Salary commensurate with education and experience.

For prompt consideration, send your resume in confidence to:

Cindy Powers

GEICO

5260 Western Avenue, Chevy Chase, Maryland 20015

An Equal Opportunity Employer M/F

MANAGER
Medical Computing Facility

Washington University is seeking a qualified individual to plan, implement, and manage a computer service center to be located at the School of Medicine campus. The service center will provide MUMPS facilities augmented by IBM 360/65 services. The Manager will report to the Director of the Computing Facilities, and will be a senior member of the Computing Facilities management group. The ideal candidate will have educational background in computing, familiarity with MUMPS and IBM 360/65 OS, experience in medical applications, and have management experience. Candidates should forward resume (in confidence) to: **Director Computer Facilities, Box 1152 Washington University Saint Louis, Missouri 63130**

An Equal Opportunity/Affirmative Action Employer

Information/Data Systems Manager

Unique opportunity for an experienced information and data systems manager to design and develop an advanced, innovative system supporting administrative and clinical activities in a large pre-paid group practice. Anticipated subsystems include a medical care information system for support of clinical care, quality of care assessment, and management planning and evaluation; an accounting-billing system; an appointments and scheduling system; and associated rationalization of information flows. High level administrative responsibility with opportunity to participate in quality of care and assessment of health services.

Qualified candidates must have a minimum of two years experience in data systems design and management, preferably in ambulatory health care, and demonstrated performance in systems analysis, development, management. Knowledge of management problems in health services delivery programs, hardware requirements and costs, modern fiscal and management procedures is essential. Applicants should possess an MBA or analogous degree with concentration in information systems.

Salary negotiable; Liberal fringe benefits. An Equal Opportunity Employer.

Reply CW Box 4190
797 Washington St.
Newton, Mass. 02160

Computer Professionals

Your next employer is a friend of ours!

We know him because we know just about everyone who controls EDP employment. And most of them we know on a very friendly first name basis.

So, whenever you're ready to advance your career just contact your nearest ESP Associates office. We'll show you a wealth of career opportunities from which to select your preferences. And we'll give you a glowing introduction to your next employer... either in your own locality or anywhere else if you want to relocate.

CHICAGO
McCormick & Associates, Inc.
386 North York Street
Elmhurst, Illinois 60126

CLEVELAND
McCormick & Associates, Inc.
601 Rockwell Avenue
Cleveland, Ohio 44114

DALLAS
Data Processing Careers
Suite 1109
Stemmons Tower West
Dallas, Texas 75207

DETROIT
Electronic Systems Personnel
1705 Fisher Building
Detroit, Michigan 48202

HARTFORD
Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105

KANSAS CITY
Electronic Systems Personnel
370 TenMain Center
Kansas City, Missouri 64105

LOS ANGELES
Career Data Personnel Agency
Suite 323
3303 Wilshire Boulevard
Los Angeles, California 90010

MILWAUKEE
EDP Consultants
11430 W. Bluemound Road
Wauwatosa, Wisconsin 53226

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402

PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Penna. 15219

SAN FRANCISCO
The Computer Resources Group
303 Sacramento Street
San Francisco, Cal. 94111

ST. LOUIS
Christopher & Long
7777 Bonhomme, Suite 1801
St. Louis, Missouri 63105

WASHINGTON, D. C.
ESP Systems Corporation
Suite 704
1211 Connecticut Ave. N.W.
Washington, D. C. 20036

esp associates

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROGRAMMER ANALYST

a national computer services firm, embarking on an ambitious expansion program, is seeking proven producers with experience in any of the following areas:

IBM COBOL; PL/1; ALC
IMS; CICS; TOTAL;
MINI COMPUTER APPLICATIONS AND SOFTWARE

Positions available in the Midwest, Northeast and Southeast. Salaries commensurate with ability. Company paid benefits.

Call or send resume to
Mr. Clif Taylor, (214) 243-3421

CUTLER–WILLIAMS, Inc.

2655 Zillacrek Drive, Dallas, Texas 75234
An Equal Opportunity Employer M/F

COMPUTER TERMINAL SALES

ATLANTA
CHICAGO
LOS ANGELES
NEW YORK
WASHINGTON
CONNECTICUT

We offer career opportunities for individuals experienced with computer terminal or data communications equipment. These six new openings are the result of increasing demand for our products and service capabilities.

Our products include the AJ 841 Selectronic Terminals, AJ 630 Thermal Keyboard Printers, Model 33 Teletypes, Digital Tape Cassette Recorders, Modems, Acoustic Data Couplers, and OEM products. Two major new products will be introduced within six months. We design, manufacture, sell, finance leases and service our own products. The Company is six years young, financially sound, increasingly profitable, and will exceed $11M in sales this year. Excellent compensation package includes salary, commission, and fringe benefits.

To qualify, you must show a successful sales career path. Write, don't call.

Mr. Thomas B. Zmach
Anderson Jacobson, Inc.
1065 Morse Avenue
Sunnyvale, Calif. 94086

ANDERSON JACOBSON, INC.

Programmers

CSC

Omaha, NB
Warminster, PA
Moorestown, NJ
Hampton, VA
Virginia Beach, VA
Huntsville, AL

In the beginning --- there was science . . .

The computer science . . . and now Computer Sciences Corporation, the world's acknowledged leader in Information Sciences.

We offer Computer Science Careers to talented individuals like you, and allow maximum freedom for your self actualization. Mail your resume to:

Ron Naftal
Coordinator Manpower Development
Defense Systems Center
COMPUTER SCIENCES CORPORATION
P.O. Box N
Moorestown, New Jersey 08057

COMPUTER SCIENCES CORPORATION

An equal opportunity employer M/F

WANT A CHALLENGE?

We are a progressive data processing department located in headquarters in the Boston area, interviewing to fill the following positions:

- **Programmer Analyst — Solid System/3 experience, knowledgeable in accounting and must have the ability to function at both the programming and systems level. Experience with other languages is a definite plus.**
- **Programmer Analyst — Having previous project responsibility. Must be well versed on the IBM 360/370 having a good command of JCL language as well as Cobol or PL1. Experience with the System/3 is a definite plus.**
- **T/P Analyst — Position requires previous experience in establishing a T/P network from the feasibility study thru to the selection and installation of terminals.**

Please send your resume and salary requirements to:
CW Box 4193
797 Washington St.
Newton, Mass. 02160

COMPUTER SYSTEMS ANALYST–HOSPITAL

University of South Alabama, Mobile Ala. College degree and 3-5 Yrs. experience desired. 14K-16K commensurate with experience. Send resume in confidence to:

Ted Ferguson, Director
Personnel Relations
University of South Ala.
Mobile, Ala. 36688

PROGRAMMER-ANALYST

Seeking an operating systems programmer-analyst with experience on CDC 6000 series or Cyber 70 computers under SCOPE 3 or KRONOS 2 for our academic computer center. The position will be available September 1st and may be full time or part time. Salary will be commensurate with experience. Excellent benefit package and working conditions. Forward resume and salary requirement to:

NORTHWESTERN UNIVERSITY
Personnel Department
1812 Chicago Avenue
Evanston, Illinois 60201
An Equal Opportunity Employer M-F

PROGRAMMER/ANALYST

Large Community College Chicago Metro Area. Minimum 3 years experience 360/370 BAL/COBOL programming. Some experience in BTAM, CICS, or Westinghouse T/P interface. Starting salary to $14,000. Excellent fringe benefits.

Send letter & resume to
Dr. L. Hubbell
TRITON COLLEGE
River Grove, IL 60171
Equal Opportunity Employer M-F

ACADEMIC OPENING COMPUTER TECHNOLOGY

Purdue University
at Fort Wayne

Fall Semester — August 20, 1974
Requirements Ph.D. or Master's.
Experience in FORTRAN, RPG and Business Systems. Versatility is important. Purdue University is an equal opportunity/affirmative action employer. Write immediately to:

Prof. John T. Gorgone
PURDUE UNIVERSITY
2101 Coliseum Blvd. East
Fort Wayne, Indiana 46805

EDP Opportunities

State of Arizona

Systems Analyst II

Implement statewide Arizona Criminal Justice Information System including designing systems requiring interfacing of hardware and software communications systems.

Systems Programmer II

Supervise Honeywell 6000 line system for Dept. of Administration. This position requires 5 years programming experience including 2 years Honeywell 6000 line.

For additional information regarding this challenging opportunity, please write or call Eleanor Moore (602) 271-5216

Arizona State Personnel
1831 W. Jefferson Ave.
Phoenix, Arizona 85007
An Equal Opportunity Employer M/F

PROGRAMMERS

As a leading manufacturer of advanced computer oriented navigation systems, we have learned the importance of keeping our employees challenged and motivated. And it doesn't really take all that much. Our interest in knowing who our people are and what they want out of their careers shows them that we do care. Couple this fact with our great track record in winning impressive contracts . . . and you wind up with a very desirable career atmosphere for the talented, creative professional. Currently we have openings for:

SR. SYSTEMS PROGRAMMER:

Knowledgeable in the design and implementation of systems support software including assemblers, compilers, utility programs, etc. Experience in the evaluation of hardware architecture and language requirements for multiprocessor application is desirable. Position requires a strong assembly language programming background. Programming experience on System 370 is preferred.

SR. APPLICATIONS PROGRAMMER:

Knowledgeable in the program design, coding and implementation of systems involving engineering & scientific applications. Solid IBM System 360-370 assembly language and JCL experience required. Applicant should have a good background in FORTRAN IV on large scale computers. Position will include advance development of utility programs, diagnostic routines, and support software systems.

If any of the above descriptions sound like you . . . let's talk. Our salaries are quite competitive, we offer a full line of benefits and we'll even give you a three week vacation your first year with us. And Grand Rapids Michigan is recognized as one of the finest recreational areas in the country. So let us hear from you. Send your resume and salary history in confidence to Ron Barkman.

ISi

LEAR SIEGLER, INC. / INSTRUMENT DIVISION

4141 EASTERN AVENUE, S.E. / GRAND RAPIDS, MICHIGAN 49508

An Equal Opportunity Employer M/F

Data Processing Personnel

Bechtel, an international leader in construction, engineering and management services, has immediate openings for the following

Programmer/Analyst System 3

Must be able to design, program, test, document and assist in the implementation of programs for jobsite use on IBM System 3 computer. Will participate in system design, modifications to existing programs and development of user and operations documentation. Must have 2-4 years' data processing experience with at least one year recent experience using Disk RPG II. Should have small systems experience, preferably on IBM System 3.

Send detailed resume to **S.L. Harding, Dept. 24-72, Fifty Beale Street, San Francisco, California 94105.**

equal opportunity employer
male/female

BECHTEL

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

UNIVERSITY OF NEW HAMPSHIRE – DIRECTOR OF THE CENTER FOR COMPUTATIONAL SERVICES.

Responsible for service organization providing broad range of computational capabilities for academic and administrative needs of multi-campus State University of New Hampshire System. Requires imaginative use of hardware and software systems to support normal production and development services of administrative data processing system and educational and research needs of academic community of students, faculty and professional staff. The approach to providng computational services will include, but not be limited to, centralized computer facility, network of conversational terminals, remote job entry stations, and leased time on other networks (academic or commercial). Responsible for planning and management of Center for Computational Services and for coordinating computer activities and services for State System.

Successful candidate will have demonstrated strong organizational and managerial ability in developing timely and effective solutions for needs of comparable organization. Application deadline: October 1, 1974. Send resumes to:

R.S. David, Chairman, Search Committee
Room 227, Kingsbury Hall
University of New Hampshire
Durham, N.H. 03824.
An Equal Opportunity Employer.

SYSTEMS ANALYSTS

Maryland Cup Corporation, a NYSE manufacturer, has several new openings for Systems Analysts. COBOL and ALC on an IBM 370/145 under DOS/VS necessary. These positions offer the unique opportunity to realize full potential. Excellent salary and benefits. Suburban location north of Baltimore, Maryland.

MARKETING ANALYST
Position for systems analyst with experience in Marketing research and Production analysis. Degree and 4 or more years experience necessary.

INVENTORY MANAGEMENT ANALYST
Position requries Inventory and Distribution systems experience. Will establish Inventory Controls procedures. Degree and 4 or more years experience necessary.

Send complete confidential resume including educational background and salary requirements to:

Mrs. B. Green
OFFICE PERSONNEL DEPT.
MARYLAND CUP CORP.
10100 REISTERTOWN RD.
OWINGS MILLS, MD. 21117
An Equal Opportunity Employer M/F

Buy Sell Swap

ACCESS
FLOORING
We buy, sell, install & service computer room access flooring.
Call or Write:
f. h. chase, inc.
Avon Industrial Park
Avon, Mass. 02322
(617) 237-2000

ACS
WANTED
IBM 029
KEYPUNCHES
FOR SALE
8K & 12K 1440
DISK SYSTEMS
7335 TAPE DRIVE
FOR 1440 SYSTEM
Member Computer Dealers Assoc.
ACS Equipment Corporation
8928 Spring Branch Drive
Houston, Tx 77055
(713) 461-1333

360/20
CARD SYSTEM
16K (8083), (8099), (1580)
2203 (5558), (9088)
2560 (1575)
IMMEDIATE DELIVERY
(Principals Only)
CONTACT
C. M. WILLINGHAM
(214) 241-4292

COMPUTER SALES, INC.
901 Office Park Plaza
Oklahoma City, Okla. 73105
360-370-SYSTEM/3
BUY-SELL-LEASE
Immediate Funds for Long Term 370 Financing
Please call or write:
Okla. City
(405) 848-8691
St. Louis
(314) 727-7010
Houston
(713) 444-0246

GO GREYHOUND **EXCELLENT IBM 360/370**
PRICE — you must agree
QUALITY — mfg. maint. assured
EXPERIENCE — from 1401s to 370
ASSISTANCE — financial & technical
SYSTEMS
SUB-SYSTEMS
UNITS
FEATURES
Greyhound Can Help You Meet Your Objectives.
Mr. T.A. Takash
Director of Equipment Sales
Greyhound Computer Corporation
Greyhound Tower
Phoenix, Arizona 85077
(602) 248-5978
Mr. Pete Ahern
Manager of Equipment Sales
Greyhound Computer Corporation
10 South Riverside Plaza
Chicago, Illinois 60606
(312) 751-5430
Mr. M.W. Tucker, Jr.
Manager of Equipment Sales
Greyhound Computer Corporation
7540 LBJ Freeway, Suite 333
Dallas, Texas 75240
(214) 233-1818

IBM 1401 Disk System
Available Sept. 1, 1974
IBM 1440 Disk System
Available Sept. 21, 1974
Both Systems are for Sale or Lease
THE HALSEY CORPORATION
1367 Central Avenue
Middletown, Ohio 45042
(513) 424-1697
Member - Computer Dealers Assoc.

FOR SALE

360/40 G 128K 2 Chl.	$65,500
360/30 F 64K 1 Chl.	$27,500
1403-2 2821-1 2540	$72,000
2314-1 2 Chl. SW	$63,500
2314-1 DASF	$61,000
1401-C3, 1402-1, 1403-2	$11,500

Call or write Dave Buckler
THE COMPUTER EXCHANGE, INC.
11 Grace Ave.
Great Neck, N.Y. 11021
(516) 466-6500
Member Computer Dealers Assoc.

COMPUTER CLEARING CORPORATION
BROKERAGE SPECIAL
SINGER SYSTEM 10

Quantity	Description
1	Model 20 Processor
	30K Core Memory
	File Access Channel
	Disc Controller
2	Input/Output Channels
2	Model 40 Disc Drives
1	Model 52 Line Printer
2	Model 70 Workstations
2	Form Aligners

Please call or write for additonal information (See above ad)

145
Serial #10095
For Sale or Lease
By Owner
Available September 1, 1974
I/O Sets also available
Contact: Harry Blair
Computer Installations Corp.
(713) 524-1401

Lease Buy Sell
DEAL WITH PROFESSIONALS IN PLACEMENT OF PRE-OWNED EQUIPMENT
360/370
"The Nations Largest Wholesale Dealer"
COMPUTER WHOLESALE CORP.
Suite 441-447
National Bank of Commerce
New Orleans, La. 70112
(504) 581-7741

FOR SALE
3-360/30 64K 1.5 CPU
1051-1052 FOR LESS THAN 8 MOS. I.B.M. Rent (Ea.) 360/50H. 3-Ch.
(1) 1403-M2 (1) 2804-1
(1) 2821-1 (5) 2401-M2-9Tr.
WANTED All IBM Equip.
N.C.R. 31-32 Burroughs L Series
CROMWELL ASSOCIATES
23 Rutgers Road
Jackson, N.J. 08527
(201) 363-8012/8026

IBM DISK SALE!

Qty.	Type	Description
2	2314/A1	Controller
2	2313/A1	4 spindles
2	2312/A1	1 spindle
1	3830/2	Controller
1	3830/1	Controller
3	3330/1	2 spindles
4	2311/1	1 spindle

Call or Write
Forsythe/
McArthur Associates, Inc.
919 N. Michigan Ave., Chicago, Ill.
(312) 943-3770 TLX: 25-5161
Member Computer Dealers Asso.

OAC buys, sells and leases
UNIT RECORD EQUIPMENT
All Models Available
Refurbished
Under IBM MA
IBM COMPUTERS
All model 360/20's, 360/30's 40's, 50's, and 65's. 370's and System 3's. All peripherals.
1401 SYSTEMS
Call: Don Norris
Jim Bickle
DATA AUTOMATION CO. INC.
4858 CASH ROAD
DALLAS, TEXAS 75247
(214) 637-6570
Member Computer Dealers Assoc.

BUY • SELL
TELETYPE®
Machines — New, Used
Telex and TWX/DDD
• Models 28, 32, 33, 35, 38
• BRPE's • CRT's • Couplers
• Enclosures • Modems
• 10, 15, 30 CPS Terminals
NAT'L TELETYPEWRITER CORP
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

1600 Broadway
New York, New York 10019
(212) 541-6340
029 **Buy·Sell** 026
029 **LEASE** 026
IBM 360/20
SIMPLICITY COMPUTER

WANTED
TELETYPE® EQUIPMENT
New • Used • Parts
– ALSO –
• Data Terminals • Peripherals
• Mini-Computers • Modems
Contact us for data terminal sales, service, supplies and rentals.
TERMINAL SYSTEMS INC.
11300 Hartland St.
N. Hollywood, Calif. 91605
213-769-6772 TWX 910-499-2675

FOR SALE
IBM 360/30 65K
3–2311's
1–2841
Call or Write
The York Bank and Trust Company
Ronald M. Fries,
D.P. Manager
P.O. Box 869
York, Pa. 17405
(717) 843-8651 Ext. 307

SALE,
LEASE, TRADE
2314-A1
5-Drive 60 MS
Computer Marketing, Inc.
(215) 635-6112

DON'T READ THIS AD
Unless you want conclusive proof that *Computerworld* Classifieds get responses, and results.

SALE!!
3360-3 (Avail. Immediately)
3360-5 (Avail.-60-90 days)
370/155 & 165 Memory
Call or Write:
Leasing Dynamics Inc.
3101 Euclid Ave.
Cleveland, Ohio 44115
(216) 687-0100

we buy and sell
IBM Unit Record Machines
IBM 735 I/O Terminals
NCR 31 - 32 - 33 - 395 - 400,
NCR 480 - 481 - 482 - 450
BURROUGHS - L - SERIES
marion 84 Kennedy St. Hackensack, N.J. 07601 (201) 343-4554

We buy, and sell and install
New and Used Computer Room Flooring
Please write or call
Raised Floor Installation
19 Sebago Street
Clifton, N.J. 07013
(201) 778-2444

FOR SALE OR LEASE
024-$350; 026-$1300; 047-$2700; 056-$250; 077-$550; 082-$900; 083-$2300; 085-$1400; 088-$3300; 188-$16,000; 402-$1300; 403-$1400; 407-$3300; 514-$900; 519-$1300; 526-$2200; 548-$2000; 552-$1400; 557-$3700; 602-$400;
729 (6) $1600
1401-4K System-$11,000
Member Computer Dealers Association
THOMAS COMPUTER CORPORATION
Suite 3807A
600 N. McClurg Court
Chicago, Illinois 60611
(312) 944-1401

360/20
Disk - Tape - Card
Buy - Sell - Trade - Lease
Specialists in Model 20
CMI Corporation
23000 Mack Avenue
St. Clair Shores, Mich. 48080
(313) 774-9500
TWX (810) 226-9708
Member Computer Dealers Association

B-3500 System for Sale at 50% of Burroughs's Price
—210 KB CPU
—140 Million Disk Storage
—1100 LPM Printer
—4-144 KB Tape Drives
—800 CPM Reader
—300 CPM Punch
—Teleprocessing Hook-up for TC-735 Teller Terminals
SYSTEMS MARKETING, INC.
100 W. Clarendon, Suite 1562
Phoenix, Arizona 85013
(602) 248-0457

FOR SALE
By Prudential
IBM 2303-1's and
IBM 2841-1's
All equipment under IBM maintenance
Available Sept. 30, 1974
Contact:
Hilary Young
(201) 336-2730

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

FOR SALE
IBM 360/20 C1
1403-2 Ptr.
2501-82 CR
2520-A1 R/P
Immediate Delivery
FOB NY $30,000.
RCA 594 Disk Drives
$4500. each
Data Options Corp.
Hartsdale, NY
(914) 723-3800

For Sale by Owner
IBM 360-30 64K
Available 9/15/74
IBM 360-40 128K
Available 10/15/74
Contact: Mr. Madison
Buffalo Savings Bank
545 Main Street
Buffalo, New York 14203
(716) 852-5130

IBM 1401 WITH 1311 DISK
For Sale
Also 729 Tape Drives
D.P. Equipment Marketing Corp.
260 W. Broadway, N.Y. N.Y.
CALL (212) 925-7737 Ext. 1

FOR SALE
370/145
3830/3330's
IPS has for sale for August delivery a 370/145H with 3 selector channels, word buffer, and 3215-1 console. Available with additional IBM or OEM memory.
Also available are 3830-1 controller, and 3330-1 disc drives, for 30-60 day delivery.
IPS
IPS COMPUTER MARKETING CORP.
467 Sylvan Avenue,
Englewood Cliffs,
New Jersey 07632
(201) 871-4200,
TWX (710) 991-9677
"MEMBER COMPUTER DEALERS ASSOCIATION"

360/20
FOR SALE OR LEASE
D2 – 16K
2 – 2311 – 11's
2560, 2501
1403-2
Jim Young
(617) 547-2111

FOR SALE OR LEASE
2365-2
2701-1 with Features
3855, 7698, 8029
2848-3 with Features
3357, 3859, 4787
5340, 5341
Controls (6) 2260's
Available with/without 2260's
Contact: Jennie Dugal
(301) 652-5766
FEDERAL DATA CORP.
5454 Wisconsin Avenue
Chevy Chase, Maryland

MINI-COMPUTER
D-116/8K CPU (NOVA Compatible) Sykes CC-200 Dual Cassette Unit TTY/CRT Interface Controller, RS232C Interface W/ Auto. Ans., Full tape based OS W/Assmb. Editor, etc., Tape Based "BASIC" Compiler.
$8500, complete. Immediate Delivery Installation/Software Consulting Also Available, if Desired.
2700 Neilson Way 1032
Santa Monica, CA 90405

For Sale
BRAND NEW EXPANSION OR REPLACEMENT CORE MEMORY MODULES
for
DEC PDP-11
General Automation
SPC-16
Digital Controls
DCC-112
Instant shipment, exceptionally attractive prices. Call Jack Devine or Don Chandler, 305/566-7611
TWX: 510 955 9828

DPF INCORPORATED DPF INCORPORATED DPF INCORPORATED
DPF INCORPORATED
buy • sell • lease • trade
Wanted IBM System 370's
Available: IBM Systems 360/370
Special Offerings:
2302 Disk (Mod 4)
2303/2841 Drum, Control
2702 Communications CU
2844 Aux. Disk Control
dpf DPF INCORPORATED
141 Central Park Avenue South
Hartsdale, New York 10530
Write or call: Norman Usher, Director of Brokerage, (914) 428-5000
DPF INCORPORATED
DPF INCORPORATED DPF INCORPORATED DPF INCORPORATED

We Need:
1419
2314-A-1
2314-1
BUY SELL LEASE
FOR BETTER VALUE LOOK TO:
Available:
360/40
360/30's
Any core size
cac COMPUTER ACQUISITIONS COMPANY
P.O. Box 80572 Atlanta, Ga. 30341 (404) 458-4425

-SALE- 360/65 -LEASE-
SYSTEMS AVAILABLE
1130
360/20
360/30
360/50
370/155
ECONOCOM, INC.
Subsidiary of Cook Industries Inc.
855 Ridge Lake Blvd.
P.O. Box 171116
Memphis, Tennessee 38117
(901) 767-9130
I/O AVAILABLE
2401-5's
2401-6's
2501-B2
2520-B2
I/O Sets
"MEMBER COMPUTER DEALERS ASSOCIATION"

OUTGROWING SYSTEM CAPACITY??
LETS TALK TRADE!!!
L & A computer industries, inc.
Fox Hill Office Park
10955 Granada Lane
Overland Park, Ks. 66211
(913) 381-7272

ITEL is selling:
- 360/50HG
- 360/65 H
- 360/30E
- 360/40G
- DUPLEX 360/67IH w/2365's
- 370/145H
- 370/155I
- 370/155J
- 145 IBM CORE
- 155 IBM CORE
- 155 AMS MEMORY (2 meg.)
- 2365-2's
- I/O SETS
- 2314's (MOD 1's & A1's)
- 2816

ITEL is buying 135's, 145's, 155's and 165's.
Call the Computer Sales Corporation at ITEL.
In San Francisco, call Fred Hegeman at (415) 983-0410
or Dick Hynes at (415) 983-0278 or Bob Gulko at (415) 983-0388.
In Dallas, call Tom Brown at (214) 620-2787.
ITEL CORPORATION
One Embarcadero Center, San Francisco, California 94111

FOR SALE
CPUs, PERIPHERALS, MEMORY
IBM 360
HON 200/2000
UNIVAC 1108-II
418-II, 1004/5, 9200
MEMOREX 40 & 50
MINIS & PERIPHERALS
HONEYWELL
115/2 System
1200 System
2200 System
Peripherals
Memory
200 RJE Terminals
FOR LEASE
2050A SYSTEM
(617) 261-1100
AMERICAN USED COMPUTER CORPORATION
P.O. Box 68, Kenmore Station, Boston, MA 02215
Member Computer Dealers Association

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

UNIVAC 9300

OWNER MUST SELL IMMEDIATELY

CALL COLLECT

913-381-7272

WANTED

ALL 360 SYSTEMS

360/30 1401 1440 2311 360/25 360/20 360/40

CORPORATE COMPUTERS, INC.

115 Mason St., Greenwich, Conn. 06830 (203) 661-1500

Member Computer Dealers Association

IBM UNIT RECORD EQUIPMENT

024	083	402	523
026	084	403	548
029	085	407	552
056	087	408	557
077	088	514	602
082	089	519	604

IBM COMPUTERS

We Buy, Sell or Lease
360 - 20
System 3
1130

Big Savings — up to 50% on Short Term Rentals

Call us for all your needs, we buy, rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own factory and guaranteed for IBM MAINTENANCE. Contact: John Fennell V.P. for proposal. 212-689-4747 Cable: Leasatron, New York Telex: 423857 LMC U1 116 East 27th Street New York, New York 10016

LMC Data, Inc

---

370 SALE

Below are three (3) CPU's for sale from PCM. These CPU's are available for inspection by you, the customer. The serial numbers are shown and inspection is available so you will not be mislead by quotes for machines which are available until you request to see them.

3135(GF) 196K #60111

Direct Control
1st Selector Channel
2nd Selector Channel
3210 Adapter
3046(01) Power Unit

3145(HO) 256K #10564

Second Selector Channel
Third Selector Channel
Word Buffer
3215 Adapter

3155(100) 512K #10738

Direct Control
Third Block Multiplexer
Fourth Block Multiplexer
3215 Adapter
3360(03) Core Storage #21448
3215(01) Printer-Keyboard #12766

FOR MORE INFORMATION CALL OR WRITE

Pioneer Computer Marketing Corporation
2636 Farrington Street
Dallas, Texas 75207
(214) 637-0950

360-370 market place

BUY — SELL — LEASE

TLW COMPUTER INDUSTRIES INC.

ATLANTA: 3570 American Drive, Atlanta, Ga. 30341
404-451-1895 TWX 810-757-3654
CHICAGO: 312-295-2030
SAN FRANCISCO: 408-249-0110
LOS ANGELES: 213-373-6825

360/40 128K

loaded with features

1052

Serial # 22580

Priced for quick sale
Immediate delivery

tbi®

TBI Equipment Div.
Time Brokers, Inc.
500 Executive Blvd.
Elmsford, N.Y. 10523
(914) 592-4065

Nationwide broker/dealers of DP equipment & computer time
Boston, Chicago, Elmsford, N.Y., Los Angeles, New York City, Washington, D.C. and San Francisco
Member Computer Dealers Association

LET ME BE YOUR MAN IN EUROPE

Specialist in buying, selling used IBM equipment, systems, peripherals, unit record.

Contact: After October 1, 1974
JORDAN HALPER
106 Blvd PEREIRE,
75017 PARIS, FRANCE
TEL. 754-6225

Wright Line Data Bank

FOR SALE

Double Door — Four Hour
Class A
Capacity 310 Reels Mag Tape
Price: $2700.00

For Information Write:
Southwest Bank
Post Office Box 1748
Vista, California 92084
Attention: Rod Ingleright

FOR SALE BY OWNER

360/20 16K

DISK/CARD SYSTEM

2 2311 Drives	200 CYL
2203 Printer	Mod. A-1
2256 MFCM	Mod. A-1

with 2 Print Heads
2311 Disk Packs

Contact: George Aivalis
American Saw & Mfg. Co.
301 Chestnut Street
East Longmeadow, Ma. 02028
(413) 525-3961

FOR SALE

ORIGINAL
IBM 370/145
CORE MEMORY

(IBM will install & service.)

Upper 256K available with MG for A 512K 370/145 Mod 1.

Bids Accpeted
Call (212) 856-5882
Mr. Finn

WANTED

BURROUGHS
L SERIES

TC 500, TC 700
NCR 31, 32, 41, 42
481-482

FRIDEN Computypers and Flexowriters
IBM 735 I/O Terminals

Call Stuart Rubenstein

I.O.A. Data Corp.

383 Lafayette St., N.Y. 10003
(212) 673-9300
Member Computer Dealers Assoc.

FOR SALE

UNIVAC

80 Column 1001
1005-111 Tape
Uniservo 6C tape
subsystem Master & Slave

WE WANT TO BUY

UNIVAC 1004/1005

Contact M.A. Jarrett

MAINTECH INC.

1133 Ave. of the Americas
New York, N.Y. 10036
(212) 586-2823

CROSS

BUYS • SELLS • LEASES

360/20's AVAILABLE

D2-16K 1403-2,
D2-16K 2203A1,
D2-16K 2203AI,
D4-16K 2203A2,
C1-8K 2203A1,

2560A1/with disc
2560A1/with disc
2560-2415-1
2501A2, 2520A3/disc
2560A1

★ ★ ★

360/30, 40, 50 and 65's with/without I/O sets
Tape & Disc Avail

★ ★ ★

Systems/3 5410A14
16K Disc System
5406B3 12K Disc System
3135-GDO 147K with periph.

★ ★ ★

WANTED 145 12 CPU

CALL (516) 487-9812

CROSS COMPUTER CORPORATION
505 Northern Blvd. Great Neck N.Y. 11021
TELEX 12028
MEMBER COMPUTER DEALERS ASSOCIATION

360/370 BUY-SELL-LEASE

Call or Write:
George S. McLaughlin
Associates, Inc.
480 Morris Avenue
Summit, N.J. 07901
(201) 273-5700
Member Computer Dealers Association

FOR SALE

STATE OF GEORGIA SURPLUS COMPUTERS:

Five (5) each IBM computers (7094, 1401, 1130, 1460 and 1410). For information and inspection of 7094, 1401 and 1130 computers contact Mr. John Gibson, The University of Georgia, Athens, Georgia, Phone: (404) 542-3106, Monday thru Friday, 8:00 A.M. to 5:00 P.M. for information and inspection of 1460 and 1410 computers contact Mr. Evan Moorehouse, Department of Administrative Services, Information & Computer Service Division, Atlanta, Georgia, Phone: (404) 656-4034. Sealed bids for these computers may be obtained from the above or State of Georgia, Dept. of Administrative Services, Personal Property Management Section, 1050 Murphy Avenue, SW, Bldg. #4, Atlanta, Georgia, 30310. Phone: (404) 656-3245. Opening time for sealed bid is 2:00 P.M., E.D.S.T., September 12, 1974. State of Georgia reserves the right to reject any and/or all bids.

GENERAL AUTOMATION 18/30

- 32 K CPU, 600 LAI printer
- 10 Million bytes of disk storage
- 9 track 800 BPI magnetic tape
- 1100 CPM card reader

Asking $70,000.
Available F.O.B., Jacksonville, Fla.
Call Mr. Rick Tighe
(904) 396-2011

WANTED

Vermont Research drum, Model 116B or DEC drum, Model RM09D or RM09E

Minimum capacity: 262K words, 256 data heads

Contact Dick Law, The Foxboro Co.
Foxboro MA 02035. (617) 543-8750

FOXBORO

SELL:

2030F0	#11734
2540	#11136
3803	#12033

B-3500 System,
085, 548

BUY:

Mod 20-By-Synch
3420-5 Tapes

SMI
SYSTEMS MARKETING, INC.

100 W. Clarendon, Phoenix, Arizona (602) 248-0457
888 N. Main, Santa Ana, CA (714) 558-9501

HARDWARE FOR SALE
DUAL PROCESSOR 645

OPPORTUNITIES UNLIMITED — Capable of Multex or GECOS II. Can be operated as Dual Processor 615, 625, 635, 645 or as an equivalent Honeywell 6000 Series System. Also included — One GIOC Front End Processor, One IOC, One 9SA Simulator (7090 — 7094 Simulator), 256 K words of Memory, 1200 LPM ASCI Printer, and some peripherals.

Qualified engineer available to oversee installation and maintenance. This equipment is for sale or lease, or will consider merger or any business venture which makes sense. Inspection invited by interested parties.

Interested? Call or write:

William L. Eaton, President
Forbes-Eaton Computer Systems, Inc.
117 East High Street
Liberty, Indiana 47353
Phone 1-317-458-5550

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

AVAILABLE FOR LEASE

October 1, 1974

370/135 GF (192K) 4650, 4668, 6981, 7855, 7861, 8637, 3046-1, 3215-1. $8,000—Per Month, 4 Yr. Term, Penalty Provisions for Early Termination — Will add Features or Memory.

370/155 — With or Without Memory

CW Box 4138
797 Washington Street
Newton, Mass. 02160

don't LEASE!

UNTIL YOU FIND OUT WHY LEASING FROM THE FULL-SERVICE COMPANY IS DIFFERENT.....

AVAILABLE IMMEDIATELY:
360/40H WITH I/O SET
360/50 I WITH I/O SET
UNIVAC 1004

CALL STEVE ELIAS AT (213) 678-0311
OR WRITE TO:

CSC
COMPUTER SCIENCES CORPORATION
650 NORTH SEPULVEDA BOULEVARD
EL SEGUNDO, CALIFORNIA 90245
Major Offices and Facilities Throughout the World

360 370

BUY SELL TRADE LEASE

Member Computer Dealers Association

We're the one with the finest reputation in the industry for on-time delivery at fair market prices. We're the one that has sold and leased over $100,000,000 in used IBM COMPUTER EQUIPMENT to hundreds of users large and small. We're the one that's publicly held and financially stable. We're the biggest in the industry; We got there because we earn our business by providing expertise, professionalism, and integrity. Call us collect or write.

AVAILABLE EQUIPMENT

370/155
Any Configuration
DAT Box Available
360/40 360/30
360/50 360/65

MISCELLANEOUS

2401 Tapes & Controllers
2710, 2702, 2361, 2803-2
360/40 Core 360/65 Core
370/155

BROKER INQUIRES INVITED

Comdisco Inc.
Home Office
2200 E. Devon Ave. Des Plaines, Ill. 60018
312/297-3640 TWX-910-233-2478

Eastern Office
2777 Summer St. Stamford, Conn. 06905
203/359-4814 TWX-910-233-2478

COMDISCO

FOR SALE

OCR
FARRINGTON 3030
PAGE SCANNER
Priced Right For Quick Sale
Call or Write
Charles Whittle
Computer Services Division
10000 Greenfield Rd.
Detroit, Michigan 48227
(313) 272-8900

FOR SALE

TC11 DEC-
Tape Controller for PDP/11

TU56 Dual DEC-Tape
(less than 100 hrs use on above)

PDP 11/40 CPU,
32K, Fl. Pt.
(still in sealed factory container)

Call: Bill Glover
(404) 993-5751

Wanted to Purchase Flexowriters

2201, 2301
2302, 2303
7102
SFD, SPD,
SPS Computypers & Models
5800, 5005, 5810, 5610, Add Punches AP5, AP6

ABR Corp.
262 Mott St., NYC 10012
(212) 431-7820

FOR SALE

NCR 500

Magnetic ledger EDP system, punch paper tape input. Can be used for Accts Receivable, Payroll, accts payable, and various other functions for trucking industry.
5 yrs old, on NCR Maintenance agreement.
Priced either with or without programs.

Contact: Warren Transport, Inc.
P.O. Box 420
Waterloo, Iowa 50704
(319) 233-6113
Attn: Howard Peterson

155—J

2 year lease

Attractive Terms

with or without DAT BOX
Avail October

with features: 1433, 1434, 1435, 5450, 7855, 3215-1

Call collect or write:

Tom Maddox
Comdisco, Inc.
2200 E. Devon Ave.
Des Plaines, Ill. 60018
(312) 297-3640

ALWAYS UP & RUNNING
LEASING, BUYING, SELLING!

WANTED

1419's
2040G
Calcomp single & dual density drives

SALE OR LEASE

2030 with I/O set
CDC 6600 system
complete with I/O and disc

BOOTHE Computer • Don Bell • (415) 989-6580

WANTED!! 360/30

Description:
64K
CPU — must have storage protect, dec. arith, 1401 Compatibility and 2 channels
1051—1052 Keyboard Console
1403 NI Printer — 132 positions
600 LPM
2540 reader punch 1000 cpm
2821 Control unit
2311 disk Packs — four (4)

Must be reasonably priced — will consider systems similar in description — private company purchasing.

CW Box 4189
797 Washington St.
Newton, Mass. 02160

Equipment Delivered Before You Pay

pcm

NOW THERE'S ANOTHER WAY TO GO

PIONEER COMPUTER MARKETING

Assets: Wholly owned subsidiary of Pioneer Texas Corporation, a listed firm on the American Stock Exchange.

Inventory: Complete inventory of IBM equipment including systems 370-135-145-155 (see our 370 Ad in this issue). Also 360/20, 30, 40, 50 & 65. Also 1403, 2540, 2821 and all models of Tape and Disk Drives. We also retain a complete inventory of all types of second generation equipment ranging from 029's to 557's.

Quality: All our equipment is guaranteed for a maintenance contract at your location and completely reconditioned prior to shipment.

Size: National marketing organization and over 1,000 customers. References furnished upon request.

Stability: Adequate financial resources for immediate action.

LET US HELP SAVE YOU MONEY
IN BUYING AND SELLING EQUIPMENT.

pcm

Pioneer Computer Marketing Corporation
2636 Farrington
Dallas, Texas 75207
(214) 637-0950

Computer leasing by the book.

Find out about Randolph's approach to computer leasing . . . customer services, DOS support, systems performance monitoring, conditional sales, system upgrades, installation practices, and more . . . in our new 4-color brochure. Call or write your nearest Randolph office today!

Northeast
537 Steamboat Road
Greenwich, CT 06830
(203) 661-4290
(212) 931-1177

Box 1963
100 Federal Street
Boston, MA 02105
(617) 434-4070

621 Country Club Road
Avon, CT 06001
(203) 673-0435

26 Cornell Place
Englishtown, NJ 07726
(201) 446-6360

Midwest
6110 Executive Blvd.
Rockville, MD 20852
(301) 770-6296

Southeast
First National Bank of Boston
Suite 2105
200 Peachtree St. NE
Atlanta, GA 30303
(404) 688-6932

Midwest
8050 Hosbrook Rd.
Cincinnati, OH 45236
(513) 793-6060

625 North Michigan Ave.
Chicago, IL 60611
(312) 787-4224

Southwest
1545 W Mockingbird Lane
Dallas, TX 75235
(214) 637-3880

3311 Richmond, Suite 200
Houston, TX 77006
(713) 529-6679

West
One Wilshire Blvd.
Los Angeles, CA 90017
(213) 680-8195

525 University Ave.
Palo Alto, CA 94301
(415) 327-2760

530 "B" Street
San Diego, CA 92101
(714) 232-6491

RCC

RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A subsidiary of the First National Bank of Boston
Member of Computer Lessors Association

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

buy lease **360/370** sell trade

CPUs
- 360/20-8K
- 360/25-24K
- 360/30s up to 256K
- 360/40 up to 384K

I/O
- 1403 Printers Models 2, 3, N1

MISC.
- IBM 360/30 Core All increments to 96K

DISK/TAPE
- 2314-1
- 2311s
- Memorex 2311s
- 2415-4
- 2804-2 Ctrl
- 2402-2 800 BPI

Call Collect. 612-546-4422

dataserv equipment inc.
400 shelard plaza o suite 415
minneapolis, mn 55426
Member, Computer Dealers Assoc.

CSC

WANTED TO
Lease or Buy
IMMEDIATELY

- CDC 9480 Series Disc Drive
- CDC Model 841 Disc Drive
- XDS Model 7242 Disc Drives

CALL OR WRITE: STEVE ELIAS
COMPUTER SCIENCES CORPORATION
650 N. Sepulveda Boulevard
El Segundo, California 90245
TELEPHONE (213) 678-0311

OUR NCR DIVISION IS LOOKING FOR:
Century 50
100
101
200
Complete systems or peripherals
Call Lloyd Peterson or Gary Zywotko
at (612) 854-2000.

EVERGREEN COMPUTER AND FINANCIAL, INC.
Member: Computer Dealers Association

CORPORATE HEADQUARTERS:
One Appletree Square
Bloomingham, Minnesota 55420
(612) 854-2000

REGIONAL OFFICES:
2720 Des Plaines Avenue
Des Plaines, Illinois 60018
(312) 298-7890

525 University Avenue
Suite 1307
Palo Alto, California 94301
(415) 321-1798

SYSTEMS 70
INCORPORATED
DATA PROCESSING EQUIPMENT SPECIALISTS

2200 E. Devon Avenue
Des Plaines, Ill. 60018
(312) 827-8135

360/370

SYSTEMS 70
INCORPORATED
DATA PROCESSING EQUIPMENT SPECIALISTS

CALCOMP
GRAPHIC SYSTEMS
FOR LEASE
ATTRACTIVE SAVINGS
925 CONTROLLERS
936/1036 PLOTTERS
MAINTENANCE AND SOFTWARE INCLUDED
CURRAN COMPUTER CORP.
946 MAIN STREET
HACKENSACK, N.J. 07601
(201) 343-3760

360/20
Card-Disk-Tape Systems
30-60 Day Delivery

ECONOCOM, INC.
Subsidiary of Cook Industries, Inc.
855 Ridge Lake Blvd.
Memphis, Tenn. 38117
(901) 767-9130
MEMBER COMPUTER DEALERS ASSOCIATION

SELL OR SWAP
TWO 1401 SYSTEMS
WITH TAPE, CARD READER AND PRINTER
Call R. Bourdages
BACHE & CO., INC.
100 Gold Street
New York, New York 10038
(212) 791-3525
TWX: 710-581-5690

FOR SALE
IBM 1401-B C.P.U. Ser. #28739
1402-1 C.R.P. to
w/5890 P.F.R. 25184
1403-2 Ptr. 15707 $8,000.00
WILL SELL ALL/OR PART
Data Options Corp.
Station Plaza
Hartsdale, N.Y. 10530
Telephone: (914) 723-3800
Member: Computer Dealers Association

IBM 729
Magnetic Tape Units
IBM 1401 Systems Configured to your requirements.
IBM 2540 Card Read Punch
For Sale or Lease
THE HALSEY CORPORATION
1367 Central Avenue
Middletown, Ohio 45042
(513) 424-1697
Member - Computer Dealers Assoc.

1401
TAPE DRIVES
7330 & 729,
Model 2, 4, 5 or 6
Complete Systems
Also Available
CMI Corporation
23000 Mack Avenue
St. Clair Shores, MI. 48080
(313) 774-9500
TWX 810-226-9708
Member Computer Dealers Association

WANTED
Burroughs L Series, TC's
Basic IV
IBM 1130 - 16K
NCR - 31, 32, 41, 42, 482, 450

SALE • LEASE
Burroughs L5122-679
Phillips P359-1000
TC 525 with Tape I/O
Contact: Scott Boynton Co.
Box 87, Route 208
Wallkill, N.Y. 12589
(914) 895-3369

Sale or Lease
Syst. 3 Model 6
- 10 Megabytes of Disk
- Bi-Directional LEDGER CARD PRINTER

1401 SYSTEMS
8K-12K-16K
with or w/o TAPE DRIVES

1440 DISK SYSTEMS
All Immed. Avail.
Short Term Rentals
(212) 673-9300
I.O.A. DATA CORP.
383 Lafayette St.
N.Y.C. 10003
Member Computer Dealers Assoc.

SAME DAY SHIPMENT
Minis & Peripherals
PRINTERS
"BRAND NEW"
DATA PRODUCTS
2440 — 700 LPM
2470 — 1250 LPM
MDS 4320-300 LPM
ALSO
Centronics, Potter, CDC
A.B. Dick, IBM, HIS, Univac
(617) 261-1100
Send for Free Report "Maintenance of Computers"
AMERICAN USED COMPUTER CORP.
P.O. Box 68, Kenmore Sta.
Boston, MA 02215
member Computer Dealers Association

WANTED TO BUY
2260 Console & 2848 Controller
CRT DISPLAYS FOR SALE
Including 4800 Baud Interface
Remote IBM 2260 CRT's & Controls
2701-1 available — for interface to system
DATA OPTIONS CORPORATION
Station Plaza
Hartsdale, N.Y. 10530
Telephone: (914) 723-3800
Member: Computer Dealers Association

FOR SALE
IBM Modems
4872-2's 4872-3's
Immediate Delivery
L&A COMPUTER INDUSTRIES
Fox Hill Office Park
10955 Granada Lane
Overland Park, Kan. 66211
(913) 381-7272
Member Computer Dealers Assoc.

BUY • SELL • LEASE • TRADE
IBM 360/370
UNIVAC • CDC
HONEYWELL
Flexible plans, low rates, fast service on systems & peripherals.
CALL US

WASHINGTON	(703) 521-2900
NEW YORK	(201) 871-1890
PITTSBURGH	(412) 921-3077
ATLANTA	(404) 252-2670
CHICAGO	(312) 343-0406
ST. LOUIS	(314) 878-4741
KANSAS CITY	(816) 471-7376
HOUSTON	(713) 747-7275
LOS ANGELES	(714) 645-3712
SAN FRANCISCO	(415) 928-7202
PORTLAND	(503) 297-4721

COLOGNE	221	23	33	45
HAMBURG	040	50	30	21
GENEVA	022	61	27	54

CLC ComputerLeasing COMPANY
2001 Jefferson Davis Hwy., Arlington, Va. 22202
Brokers Inquiries Invited
Member: Computer Lessors Association

IBM 1460 SYSTEM
- 12K memory
- 1403/3 Printer (1100 LPM)
- (2) 729/v tapes (556 BPI)
- Available 9/15/74 FOB Chicago

Call or Write
Forstyhe/McArthur Associates, Inc.
919 North Michigan Avenue Chicago, Illinois 60611
Telephone: (312) 943-3770 Telex 255161 (CAPMARKCO • CGO)
Member, Computer Dealers Association

USED 370/135 GF
SN #617XX
AVAILABLE 10/15/74
3 to 8 Year
WALK-AWAY LEASE
(or SALE)
63% — 83% of Rental
(plus 7% Maintenance)
Call or Write:
Robert C. Dickhaus
LXX Computers & Peripherals, Inc.
P.O. Box 66
Armonk, N.Y. 10504
(914) 273-9278
Subject to Prior Sale or Withdrawal
Member Computer Dealers Association

Time for Sale

NEW YORK

COMPUTER TIME AVAILABLE
ULTRA MODERN MIDTOWN LOCATION OFFICE SPACE, WORK AREAS, CONFERENCE ROOM

S/360 Mod 40, 6 High Speed Tape drives (7 & 9 Track Availability), 8 — 2314 Disc Draws, 1100 LPM Printer, S/360 — Mod 30, 128 K, 6 High Speed Tape Drives (7 & 9 Track Availability), 4 — 2311 Disc's, Switching Unit for 2314's 1100 LPM Printer
Contact: Mr. Wolff
(212) 221-3535

TIME FOR SALE

NEW YORK

370/158

VS2-HASP/RJE, TSO
DOS Emulation
Disks-(18) 3330, (3) 2319
Tapes-(16) 3420 mod. 7
Printers-(5) 1403, (1) 3211
Excellent Technical Support
Very attractive rates on all shifts
Contact: Stu Kerievsky
(212) 564-3030
Datamor
132 West 31 St.
New York, N.Y. 10001

I.B.M. - 360-30

All Shifts 65K, 4-2401 MOD-2, 3-2311, 1403-N1, 2540, 1401 Compatibility
From $35.00/Hour
Restaurant Associates Ind.
1540 Broadway bet. 45 & 46th St.
New York, New York 10036
Contact:
Al Palmo at (212) 974-4966
Elliott Musikoff at (212) 974-4967

N. & S. CAROLINA

IBM 360/370 Users
Computer Time Available
370/158 - DOS & OS Time
Local & Remote Batch
On-Line Interactive
24 Hours - 7 Days
Network Computing Corp.
4827 Park Road
Charlotte, N.C. 28209
(704) 525-8810

MASSACHUSETTS

COMPUTER TIME BROOKLINE

370/135

1st and 2nd Shift
96K DOS or DOS/VS
Power 2

5-3330	1-2501
2-3420	1-1442
1-1403	

$50.00 per hour
Contact: Mr. K. Coleman
(617) 738-6410

INDIANA

HEY!

MICHIGAN, ILLINOIS & OHIO

computer time is available on a:
System 3 Model 10
48K, 1403
2-5444, 2-5445
3411, 3410

For any hours contact:
Berkel Incorporated
Ronald I. Stepanek
1 Berkel Drive
La Porte, Indiana 46350
(219) 362-3165

ILLINOIS

IBM 360/370 USERS
COMPUTER TIME AVAILABLE

370/158
2 meg, 3330 (32m), 2314 (16m), 12 3420-5 d.d. tape
OS/VS2, RJE, TSO, ATS, DOS emul.
24 Hours — 7 Days

370/155
2 meg, 3330 (8m), 2314 (8m), 12 3420-5 d.d tape

370/135
240K, 3330 (4m), 2314 (8m), 6 3420-5 d.d. tape

370/135
144K, 2314 (8m), 6 3420-5 d.d. tape

360/40
128K, 2314 (8m), 5 2401-2 tape

360/30
64K, 4 2311's, 5 3420-3 d.d. tape

FOR FURTHER INFORMATION CALL RON ELLIS
(312) 346-1331
computer research company
200 N. Michigan Avenue
Chicago, Ill. 60601
Largest Computer Time Sales Co.

370/158
Virtual
OS-MVT-HASP
DOS-VS1-VS2-
CMS

HF/II	APT	MPSX
ICES	BLISS	CROSSTABS
PICS	PAYROLL	SSP
MPS	PLAN	SAS
	BMD	PROJECT II

PAYROLL
INVENTORY CONTROL
ACCOUNTS PAYABLE
ACCOUNTS RECEIVABLE
GENERAL LEDGER

Order Entry Systems
Hyperfaster, Amigos

General Purpose Simulation System
Continuous System Modeling Program
Urban Transportation Planning System 360

TIME SHARING
REMOTE BATCH
BLOCK TIME

Your Programs or Ours

STATTAB
A Division of Statistical Tabulating Corp.
Chicago, Illinois
(312) 346-7300
Jim Hancock

Software for Sale

A COMPLETE MEDICAL BILLING SYSTEM IS AVAILABLE NOW . . . including complete **INSURANCE** for individual physicians . . . specialist groups, clinics and small hospitals.

. . . ask about our 30 day trial

- Payroll/Personnel—$1960
- Mail-All List/Letters—$660
- PLS-Source Library—$2000
- Super DOC Flowchart—$2960

Occidental Computer Systems
11311 Camarillo St.
No. Hollywood, Calif. 91602
(213) 763-5144

SOFTWARE FOR SALE

TAXBREAK
***
Payroll tax calculation module
***
Calculates payroll withholding taxes for 50 states, federal, FICA and cities. COBOL. $875 complete.
Maintenance service on tax changes available for $225 per year.
ARGONAUT INFORMATION SYSTEMS, INC.
2140 Shattuck Ave.
 # 203
Berkeley, CA. 94704
(415) 845-7991

ACCOUNTING SYSTEMS

PAYROLL
GENERAL LEDGER
ACCOUNTS PAYABLE
INVENTORY
ACCOUNTS RECEIVABLE

IBM SYSTEM/3 USERS
IBM 360-70 USERS
RPG II BAL COBOL

Certified Software Products, Inc.
3140 Harbor Lane North
Minneapolis, Minn. 55441
612-546-6919

SYSX

LOOKING FOR SOFTWARE?

Free Software Search and Package Appraisal Service

Our job is to help you locate the software packages which best meet your needs. There is no charge to you for this service. Write on your company letterhead or call:

Systems Exchange Co.
1034 Colorado Ave.
Palo Alto, Calif. 94303
(415) 328-5490

SYSX

UCANDU®

This OS/360/370 utility will become the most important tool in your library.

- Selectively lists/copies/dumps OS datasets
- Record selection based on content, position or random
- Easy to use, free-form parameter-driven
- Device independent
- Sequential or indexed sequential

UCANDU has been in productive use for over four years - MFT, MVT, VS, HASP, ASP environments.
Some uses for UCANDU:

- File sampling
- Test file generation
- Selective dumping of test output.
- Edit input/verify output
- Auditing
- SMF file processing

For more information contact:
Gulf Oil Computer Sciences, Inc.
P. O. Box 2100
Houston, Texas 77001
(713) 228-7040
Gulf
In Canada contact:
Toronto Data Centre-Systems
Gulf Oil Canada Limited
477 Mount Pleasant Rd.
Toronto, Ontario M4S 2M1
(416) 486-2077

QUERY3
COMPUTING's PREMIER INQUIRY SYSTEM

Simple English Language
Writes Multiple Reports
Powerful Selectivity
Full Computation Capability
Can Produce Output Files
Multiple Input File Option
Table Look-Up
File Security
Blue Ribbon User's List
Runs on Most Computers

AZREX
AZREX INC.
215 Middlesex Turnpike
Burlington, Mass. 01803
(617) 272-8750

MMS Accounts Receivable

Eliminates the Long Wait.

- Database Design—All Cobol
- Open Item or Balance Forward
- Multi-company
- Flexible Aging
- Simplified Cash Posting

SOFTWARE INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

COMPUTERIZED ACCOUNTS RECEIVABLE

Features

1. Automatic Cash
2. Multi-divisional
3. Cash forecasting
4. Deduction notices
5. Unearned discount
6. Dunning
7. Audit trails
8. Customized aging
9. Automatic charge-back
10. Cash tear-sheet
11. Suspense accounts
12. Expanded credit
13. General ledger totals
14. Marginal account reports
15. Credit interchange
16. On-line cash
17. Real-time credit inquiries

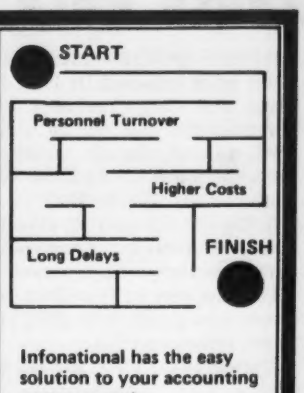
360/370 USERS

Benefits

Eliminate all these headaches:

1. Tub files
2. Late statements
3. One cash card per invoice
4. Extensive clerical effort
5. Unknown credit risks
6. Unclear detailed non-exception reports
7. Unaware credit managers

COMPUTER SYSTEMS & EDUCATION CORP.
David Shefrin
111 Ash Street
E. Hartford, Conn.
06108
(203) 528-9211
CSEC AR/70
Thomas Welsh
840 Hinckley Road
Burlingame, Calif.
94010
(415) 697-3317



Infonational has the easy solution to your accounting systems puzzle.

If you're the one with the problem of developing financial systems for your company, let us help you out. Instead of expensive and time consuming custom development, install an Infonational:

- **GENERAL LEDGER**
- **ACCOUNTS PAYABLE**
- **ACCOUNTS RECEIVABLE/ SALES ANALYSIS**
- **FIXED ASSET**

Solving your **FINANCIAL SYSTEMS** problems is our business.

INFONATIONAL
THE FINANCIAL SYSTEMS COMPANY

Boston (617) 769-5942
Chicago (312) 332-6738
Dallas/Forth Worth (817)732-6603
New York (212) 489-1660

6626 Convoy Court
San Diego, Ca. 92111
(714) 560-7070

MSA GENERAL LEDGER

WHY HAVE OVER 700 CLIENTS PURCHASED MSA SYSTEMS?

WHY HAS MSA SOLD OVER 140 GENERAL LEDGER SYSTEMS IN THREE YEARS?

HERE'S WHY!

- EFFICIENT REPORT WRITER
- STATISTICS MANAGEMENT
- FLEXIBLE BUDGETING
- ACCOUNT ANALYSIS
- COST ALLOCATION
- RESPONSIBILITY AND PROFITABILITY REPORTING
- UNLIMITED NUMBER OF REPORTING LEVELS
- PROJECT ACCOUNTING
- DIRECT, FULL ABSORPTION OR INCREMENTAL COSTING
- CURRENCY CONVERSION

USERS BY PRODUCT
PAYROLL/PERSONNEL-245
FIXED ASSETS-150
ACCOUNTS PAYABLE-60
INVENTORY CONTROL-25
OTHER BANK SYSTEMS-80

Write or Call to Compare
William M. Graves
Management Science America
3445 Peachtree Road, N.E., Suite 1300
Atlanta, Ga. 30326

MSA

Atlanta	404—262-2376
New York	201—871-4700
Chicago	312—323-5940
Los Angeles	213—475-9726
San Francisco	415—328-1700

2d Quarter, Six Months

Lease Base, Sales Boost Data 100's Earnings

MINNEAPOLIS – Increased revenues from both sales and its lease base helped Data 100 Corp. realize a 69% rise in revenues for the second quarter and a 75% gain in the six months compared with the same 1973 periods. Earnings for both periods also climbed.

In the second quarter, revenues reached nearly $16 million compared with $9.4 million in the year-ago period.

Earnings rose to $1 million or 18 cents a share compared with $722,000 or 13 cents a share in 1973.

During the 1974 quarter, both nonrecourse sales to third-party leasing companies and tax credits were larger than in last year's period. Sales to leasing firms totaled $4.1 million compared with $3.97 million in 1973, while tax credits were $427,000 compared with $347,000 in the year-ago period.

Sales to end users jumped to $5.1 million from $1.9 million in the second quarter last year.

Revenues from the lease base in the six months climbed to $12.7 million, an 86% increase from $6.8 million last year, reflecting Data 100's strategy of building this lease base as rapidly as possible because of its long-term potential, according to President Edward D. Orenstein.

In the six months, earnings rose to $1.9 million or 34 cents a share from $1.2 million or 22 cents a share in the 1973 period.

The figures include a $787,000 tax credit in 1974 and $579,000 in 1973.

Revenues jumped to $29.9 million from $17.1 million, of which $9.1 million was from sales to third-party leasing companies in the 1974 period and nearly $7 million in midyear 1973.

Orenstein noted that the firm's backlog and new order rates were at record levels at the end of June. During the first six months, Data 100 shipped a record 659 large remote batch systems, an increase of 34% over a year ago.

ACT Ups Revenues, Earnings

NEW YORK – Advanced Computer Techniques Corp.'s earnings and revenues set a record for the year ended March 31, with a 25% increase in earnings and 37% rise in revenues over 1973.

Earnings rose to $155,674 or 18 cents a share compared with $124,202 or 16 cents a share last year.

Revenues climbed to $5.1 million, up from $3.7 million in 1973.

President Charles P. Lecht attributed the improved results to controlled expansion of present operations as well as the receipt of a new contract in Iran.

Sycor Shows Improved 2d Quarter

ANN ARBOR, Mich. – A sizable jump in rentals and services helped boost Sycor's revenues for the second quarter and six months to levels above those of a year ago.

Earnings, even with a tax credit about $30,000 less than in the last year's period, rose slightly to $1.34 million or 48 cents a share for the quarter compared with $1.31 million or 48 cents a share in the 1973 second quarter.

Revenues for the period grew to $9.8 million from $8.2 million in the year-ago period. The contribution from sales declined to $6.4 million from $6.6 million last year, but rental and service income totaled $3.4 million compared with $1.5 million in the 1973 period.

In the six months, earnings totaled $2.2 million or 79 cents, including a $865,000 tax credit; the same period in 1973 showed an income of $2.1 million, including a special credit of $895,000, before a $2.1 million special charge for an accounting change left a balance of $22,700 for the 1973 period.

Half-year revenues jumped to $19.1 million from $14.2 million. Sales rose to $12.9 million from $11.4 million and rental and service income jumped to $6.2 million from $2.8 million in the year-ago period.

"We are most pleased that our rental and service income was up nearly 20% over the first quarter of this year and more than double the second quarter of 1973, thus aiding our net income results. Sycor's income after tax margin improved significantly in the second quarter to 8.3% up from 5.5% in the first quarter of 1974," said Sycor President Samuel N. Irwin.

...Toward the Bottom Line

Precision Instrument, maker of Unicon mass memory systems, has discontinued some of its magnetic tape recorder operations and will concentrate on its laser mass memory system. The firm lost $1.2 million in the six months ended March 31 compared with a loss of $1.1 million a year ago. The discontinued tape operations incurred a loss of $622,000 during the period compared with a loss of $106,000 last year.

$$$

Brandon Applied Systems' first quarter scored record results for any quarter with earnings of $502,172, compared with a loss of $216,521 in the year-ago period. Revenues trebled to $1.8 million from $515,730 in the 1973 period ended May 31.

$$$

Qume has completed a $3 million financing consisting of $2 million revolving credit for four years from the First Pennsylvania Bank of Philadelphia and $1 million in equity financing. The funds will be used to expand manufacturing capacity.

$$$

Shugart Associates has sold $3.35 million of securities to a group of private investors. Proceeds will be used to repay loans and for working capital.

$$$

Cambridge Memories has obtained $5 million of lease financing for one year from New England Merchants Leasing Corp. The funds will be used for production of new line of memories for large systems.

Real-Time Teleprocessing Analyst To Relocate To...

Australia

A once-in-a-life time opportunity is available for individuals with:

- A strong systems programming or communications background,
- Experience in management and project control, and
- A thorough knowledge of CICS

to work directly for one of the largest companies in Australia.

If you are self motivated, intelligent, personable, possess the required technical skills and are interested in getting a job done, this could be the opportunity you have been waiting for!

We have been engaged by one of our client companies in Australia to interview several analysts to work in Australia. If you firmly believe you possess the necessary technical qualifications, are self motivated, desire to become more worldly and wish to relocate—all expenses paid—send us your resume.

If after an extensive review we feel you possess the necessary qualifications, we will contact you for a series of interviews. If you don't qualify, we will not waste each other's time.

The need is real; the positions are real. All we require now is real people to do real work in real-time. Salaries are open.

Please send resumes to:

Mr. David Manner
ON-LINE SOFTWARE INTERNATIONAL
411 Hackensack Avenue
Hackensack, New Jersey 07601

EDP europa report

for those who need to know about Europe (on Markets)

EDP EUROPA REPORT

Europe is the second largest market for computers and related products. But it is a complex market, comprising ten major countries and as many languages and currencies, there are two major country groupings and an infinite number of shades of opinion on politics, trade, nationalism and every other subject.

To get the best from this market for your EDP product or service you need detailed on-the-spot analysis of the situation. And you need it from a source that is unbiased and has its fingers on all that happens which is significant to the computer industry.

EDP Europa Report, now in its fifth year of publication, specializes in supplying just this information. It is published by IDC Europa Ltd. who are on the spot in Europe to help you with other specialized marketing services to ease your way in European Markets.

EDP MARKET STUDIES

The IDC Europa series of EDP Market Studies provide a detailed and up to the minute look at specific market sectors by product and application. Based on the continuing IDC research programme involving response from both users and suppliers they look in depth at the situation of today and tomorrow.

Priced between £50 and £150 they provide the quality of a custom research study at a price within the reach of all companies. Individually or collectively they are musts for every marketing man's library.

Immediately available are studies on the OCR and COM market, the Insurance industry and its use of computers, Small Business Systems and Software Packages. More are in the pipeline.

SPECIAL OFFER

EDP europa report *published in Europe by IDC Europa Ltd. 140-146 Camden St., London NW1 9PF*

also from International Data Corporation
60 Austin Street, Newtonville, Mass. 02160

Please send me *EDP Europa Report* for 12 months (24 issues) at the price of $85.00 USA, $75.00 Europe including special FREE binder for one year's issues.

☐ Bill company ☐ Bill me ☐ Check enclosed ☐ Puchase order enclosed

Signature_____
Name_____
Title_____
Organization_____
Address_____
City_____ State_____ Zip_____

Earnings Reports

DATAMEDIA
Year Ended April 30

	1974	1973
Shr Ernd	$.12	$.12
Revenue	1,029,196	761,824
Earnings	76,695	73,156

DATA DOCUMENTS
Three Months Ended June 30

	1974	1973
Shr Ernd	$1.95	$.80
Revenue	15,260,110	10,086,223
Earnings	915,311	376,288
9 Mo Shr	4.85	2.02
Revenue	39,328,226	27,192,539
Earnings	2,276,547	947,091

SYKES DATATRONICS
Three Months Ended May 31

	1974	1973
Revenue	$784,829	$627,152
Earnings	36,518	12,347

HAZELTINE
Three Months Ended June 30

	1974	1973
Shr Ernd	$.11	$.24
Revenue	22,670,000	18,503,000
Earnings	213,000	468,000
6 Mo Shr	.21	.46
Revenue	50,732,000	36,806,000
Earnings	406,000	909,000

ITEL
Three Months Ended June 30

	1974	a1973
bShr Ernd	$.26	$.20
Revenue	39,600,000	21,100,000
Tax Cred	100,000	700,000
Earnings	2,400,000	1,800,000
b6 Mo Shr	.47	.29
Revenue	69,000,000	36,000,000
Tax Cred	300,000	1,000,000
Earnings	4,500,000	2,500,000

a-Restated.

TEKTRONIX
Year Ended May 25

	a1974	1973
Shr Ernd	$2.47	$1.94
Revenue	271,428,000	202,855,000
Earnings	21,353,000	16,739,000

a-Includes results of Grass Valley Group, acquired Feb. 21, 1974.

ITEK
Three Months Ended June 28

	1974	1973
Shr Ernd	$.08	$.52
Revenue	48,269,000	51,047,000
Earnings	260,000	1,501,000
6 Mo Shr	.05	.93
Revenue	96,256,000	100,208,000
Earnings	159,000	2,655,000

STANDARD REGISTER
Three Months Ended June 30

	1974	1973
Shr Ernd	$1.00	$.57
Revenue	38,476,989	31,214,791
Earnings	2,147,306	1,242,640
6 Mo Shr	2.05	1.04
Revenue	76,030,072	60,315,776
Earnings	4,408,686	2,248,076

UNITED TELECOMMUNICATIONS
Year Ended June 30

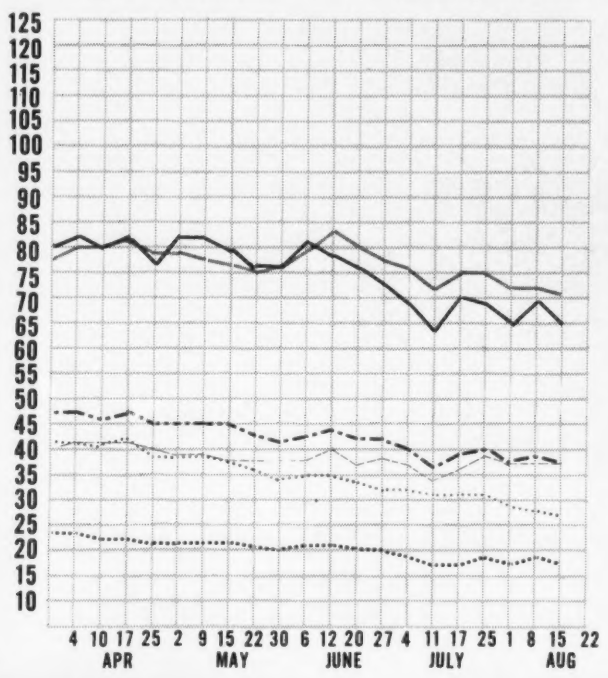
	1974	a1973
Shr Ernd	$1.60	$1.48
Revenue	890,534,000	725,739,000
Earnings	82,661,000	73,416,000
3 Mo Shr	.41	.39
Revenue	240,387,000	200,499,000
Earnings	20,731,000	20,038,000

a-Restated on pooling-of-interest basis to reflect acquisition of Florida Telephone Co.

WABASH MAGNETICS
Three Months Ended June 30

	1974	1973
Shr Ernd	$.22	$.24
Revenue	9,591,897	8,073,604
Earnings	383,016	432,273
6 Mo Shr	.50	.46
Revenue	18,167,434	15,894,456
Earnings	870,637	817,908

COMPUTERWORLD Computer Stocks Trading Indexes



* WANTED *

Firms to: Buy, Sell, Lease, Sub-Lease — 360 & 370 Systems and I/O

Write or Call Collect — Today
Its our only business

NVC COMPUTER SALES, INC.
Suite 616, Benjamin Fox Pavilion
Jenkintown, Pa. 19046 • (215)-887-5404
Member Computer Dealers Assoc.

SIGMETRICS 74-SECOND ANNUAL
SYMPOSIUM ON MEASUREMENT AND EVALUATION

Montreal
September 30, October 1 and 2

PERFORMANCE EVALUATION REVIEW
(Published Quarterly)

These are only two of the important sources of information that are available to members of the ACM. Computer professionals find that information from ACM Special Interest Groups, such as SIGMETRICS, is critical to keeping current with the latest information in the computer industry. To obtain information about:

- ☐ SIGMETRICS
- ☐ SIGMETRICS 74 SYMPOSIUM
- ☐ JOINING THE ACM

WRITE: Professor Tad Pinkerton
Dept. of Computer Science
University of Wisconsin
Madison, Wisconsin 53706
(608) 262-7972

TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1973-74 RANGE (1)	CLOSE AUG 15 1974	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	49-126	81 3/8	-10	-10.9
N	COLLINS RADIO	16- 26	24 3/4	0	0.0
O	COMPUTER AUTOMATION	5- 20	10	- 3/4	-6.9
N	CONTROL DATA CORP	20- 62	20 5/8	-2 1/4	-9.8
N	DATA GENERAL CORP	22- 49	21 3/4	-2 3/4	-11.2
O	DATAPOINT CORP	9- 21	10 1/4	0	0.0
O	DIGITAL COMP CONTROL	2- 6	2 1/4	- 1/8	-5.2
N	DIGITAL EQUIPMENT	73-121	86	-6 1/8	-6.6
N	ELECTRONIC ASSOC.	2- 9	1 7/8	- 1/8	-6.2
A	ELECTRONIC ENGINEER.	6- 14	7 1/2	- 3/8	-4.7
N	FOXBORO	23- 48	26 1/2	- 7/8	-3.1
O	GENERAL AUTOMATION	22- 55	25 1/4	-2 1/4	-8.1
O	GRI COMPUTER CORP	1- 3	5/8	0	0.0
N	HEWLETT-PACKARD CO	68- 99	68 3/8	-8 1/8	-10.6
N	HONEYWELL INC	37-139	38 1/4	-4 3/8	-10.2
N	IBM	198-340	200	-8 1/2	-4.0
O	INTERDATA INC	7- 22	19	0	0.0
O	MICRODATA CORP	2- 10	3 7/8	- 1/4	-6.0
N	NCR	27- 46	29 1/4	-1 5/8	-5.2
N	RAYTHEON CO	22- 39	29 1/4	-1	-3.3
N	SINGER CO	24- 74	25 1/2	-2 3/8	-8.5
N	SPERRY RAND	31- 56	31 1/4	-2 3/4	-8.0
A	SYSTEMS ENG. LABS	1- 8	1 7/8	0	0.0
N	TEXAS INSTRUMENTS	73-138	75	-5 1/4	-6.5
O	ULTIMACC SYSTEMS INC	1- 11	1 1/2	0	0.0
N	VARIAN ASSOCIATES	7- 20	7 3/4	-1 1/8	-12.6
N	WANG LABS.	10- 34	11 1/2	- 3/8	-3.1
N	XEROX CORP	86-169	85 7/8	-9 3/8	-9.8

LEASING COMPANIES

EXCH		1973-74 RANGE (1)	CLOSE AUG 15 1974	WEEK NET CHNGE	WEEK PCT CHNGE
A	BOOTHE COMPUTER	1- 5	1 1/8	0	0.0
O	BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O	COMDISCO INC	2- 17	1 5/8	- 3/8	-18.7
A	COMMERCE GROUP CORP	3- 6	3	0	0.0
O	COMPUTER EXCHANGE	1- 1	1/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 8	1 3/8	+ 1/8	+10.0
O	COMP. INSTALLATIONS	1- 2	1/4	0	0.0
M	DATRONIC RENTAL	1- 3	3/4	0	0.0
A	DCL INC	0- 3	3/8	0	0.0
N	DPF INC	3- 9	2 1/2	- 3/8	-13.0
O	EDP RESOURCES	1- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 6	1 1/2	- 3/8	-20.0
A	GREYHOUND COMPUTER	3- 6	3 1/8	0	0.0
A	ITEL	4- 12	4	- 3/8	-8.5
N	LEASCO CORP	5- 18	6 7/8	+ 1/4	+3.7
O	LEASPAC CORP	1- 8	5/8	- 1/8	-16.6
O	LECTRO MGT INC	1- 2	1/8	0	0.0
O	NRG INC	2- 15	2 1/4	+ 1/8	+5.8
A	PIONEER TEX CORP	2- 10	2 1/2	- 1/4	-9.0
A	ROCKWOOD COMPUTER	1- 3	3/4	-	-7.0
N	U.S. LEASING	8- 36	7 5/8	- 1/8	-1.6

SOFTWARE & EDP SERVICES

EXCH		1973-74 RANGE (1)	CLOSE AUG 15 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1	0	0.0
A	APPLIED DATA RES.	2- 4	1 3/4	- 1/4	-12.5
O	APPLIED LOGIC	1- 3	1/8	0	0.0
N	AUTOMATIC DATA PROC	21- 94	25	-2 1/4	-8.2
O	BRANDON APPLIED SYST	1- 1	3/8	0	0.0
O	CENTRAL DATA SYSTEMS	3- 9	4 1/4	0	0.0
O	COMPUTER DIMENSIONS	1- 5	1 1/2	0	0.0
O	COMPUTER HORIZONS	1- 6	1 1/2	0	0.0
O	COMPUTER NETWORK	1- 5	1 3/8	+ 1/8	+10.0
N	COMPUTER SCIENCES	2- 6	2 5/8	0	0.0
O	COMPUTER TASK GROUP	1- 2	1	+ 1/2	+100.0
O	COMPUTER TECHNOLOGY	1- 3	1/2	0	0.0
O	COMPUTER USAGE	2- 9	2 3/4	0	0.0
O	COMRESS	1- 2	1/4	- 1/8	-33.3
O	COMSHARE	2- 9	2 1/2	0	0.0
N	CORDURA CORP	2- 15	2 1/4	0	0.0
O	DATATAB	1- 4	1 5/8	0	0.0
A	ELECT COMP PROG	1- 2	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 56	15 1/2	-1 3/4	-10.1
O	INFONATIONAL INC	1- 2	1/2	0	0.0
O	I.O.A. DATA CORP	1- 1	3/8	0	0.0
O	IPS COMPUTER MARKET.	1- 5	3/4	0	0.0
O	KEANE ASSOCIATES	2- 5	1 3/4	- 3/4	-30.0
O	KEYDATA CORP	2- 12	2 1/8	+ 1/8	+6.2
O	LOGICON	2- 7	3 1/4	0	0.0
A	MANAGEMENT DATA	1- 5	1 1/4	- 1/8	-9.0
O	NATIONAL CSS INC	10- 42	11 1/2	-2	-14.8
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
O	NATIONAL INFO SRVCS	1- 2	1/8	0	0.0
A	ON LINE SYSTEMS INC	12- 31	23	- 1/2	-2.1
N	PLANNING RESEARCH	2- 7	2 3/4	+ 1/4	+10.0
O	PROGRAMMING METHODS	17- 25	17	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 24	2	- 1/8	-5.8
O	SCIENTIFIC COMPUTERS	1- 3	7/8	0	0.0
O	SIMPLICITY COMPUTER	1- 4	3/4	0	0.0
O	TCC INC	1- 1	1/2	+ 1/8	+33.3
O	TYMSHARE INC	6- 13	8 1/4	-1	-10.8
O	UNITED DATA CENTER	2- 6	3	- 1/4	-7.6
A	UPS SYSTEMS	2- 8	2 1/2	+ 1/8	+5.2
N	WYLY CORP	3- 11	2 1/2	- 1/8	-4.7

PERIPHERALS & SUBSYSTEMS

EXCH		1973-74 RANGE (1)	CLOSE AUG 15 1974	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	5- 34	5 3/4	- 5/8	-9.8
O	ADVANCED MEMORY SYS	2- 23	2 1/8	- 1/4	-10.5
N	AMPEX CORP	3- 7	3 1/4	- 1/4	-7.1
O	ANDERSON JACOBSON	2- 6	2 1/4	0	0.0
O	BEEHIVE MEDICAL ELEC	2- 10	2 1/4	- 1/4	-10.0
A	BOLT,BERANEK & NEW	6- 12	6	-1 1/4	-17.2
N	BUNKER-RAMO	5- 18	5	- 1/2	-9.0
A	CALCOMP	5- 16	7 1/2	- 3/4	-9.0
O	CAMBRIDGE MEMORIES	7- 17	8 1/4	- 1/2	-5.7
O	CENTRONICS DATA COMP	12- 38	12 1/4	-1	-7.5
O	CODEX CORP	8- 19	13 1/2	-1 1/4	-8.4
O	COGNITRONICS	1- 3	7/8	0	0.0
O	COMPUTER COMMUN.	1- 4	1	0	0.0
A	COMPUTER EQUIPMENT	1- 3	1 3/8	0	0.0
O	COMPUTER MACHINERY	2- 13	3 3/8	- 7/8	-20.5
O	COMPUTER TRANSCEIVER	1- 6	5/8	- 3/8	-37.5
N	CONRAC CORP	13- 32	14	-1 1/4	-8.1
O	DATA ACCESS SYSTEMS	1- 3	2 1/2	0	0.0
O	DATA 100	7- 19	7 1/8	-1 3/8	-16.1
A	DATA PRODUCTS CORP	2- 5	3 1/2	- 1/4	-6.6
O	DATA RECOGNITION	1- 3	1/4	0	0.0
A	DATA TECHNOLOGY	1- 5	2 3/4	+ 1/8	+4.7
O	DECISION DATA COMPUT	4- 40	5 3/8	- 1/2	-8.5
O	DELTA DATA SYSTEMS	1- 1	5/8	0	0.0
O	DI/AN CONTROLS	1- 4	5/8	+ 1/4	+66.6
N	ELECTRONIC M & M	2- 6	2	- 1/2	-20.0
O	FABRI-TEK	2- 5	1 3/4	- 1/8	-6.6
O	GENERAL COMPUTER SYS	2- 9	1 3/4	0	0.0
N	GENERAL ELECTRIC	43- 76	42 1/2	-3 5/8	-7.8
N	HAZELTINE CORP	4- 9	3 7/8	- 1/8	-3.1
O	INFOREX INC	2- 23	2 3/4	- 1/4	-8.3
O	INFORMATION DISPLAYS	1- 2	1/8	0	0.0
O	INFORMATION INTL INC	8- 15	9	- 3/4	-7.6
A	LUNDY ELECTRONICS	3- 9	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
N	MEMOREX	2- 19	3 5/8	- 1/8	-3.3
A	MILGO ELECTRONICS	9- 28	9 7/8	-1	-9.1
N	MOHAWK DATA SCI	2- 13	1 7/8	- 3/8	-16.6
O	ODEC COMPUTER SYST.	2- 6	1 1/2	0	0.0
O	OPTICAL SCANNING	2- 8	3 1/4	0	0.0
O	PERTEC CORP	3- 8	2 1/2	- 1/2	-16.6
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	2- 9	1 3/4	- 1/4	-12.5
O	PRECISION INST.	2- 6	3/4	0	0.0
O	QUANTOR CORP	3- 10	3	+ 1/4	+9.0
O	RECOGNITION EQUIP	2- 8	2 1/2	- 1/4	-9.0
N	SANDERS ASSOCIATES	3- 18	3 1/2	- 1/8	-3.4
O	SCAN DATA	1- 6	1 1/8	- 1/4	-18.1
O	STORAGE TECHNOLOGY	9- 34	9 5/8	-1 1/8	-10.4
O	SYCOR INC	7- 20	7 1/4	- 1/2	-6.4
O	TALLY CORP.	2- 14	2 1/8	0	0.0
O	TEC INC	3- 9	3	- 1/4	-7.6
N	TEKTRONIX INC	25- 55	24 1/2	-5 1/8	-17.2
N	TELEX	3- 8	3 1/8	- 1/2	-13.7
O	WANGCO INC	7- 13	7 1/4	- 5/8	-7.9
O	WILTEK INC	3- 18	3 1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1973-74 RANGE (1)	CLOSE AUG 15 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 9	4 3/4	0	0.0
A	BARRY WRIGHT	5- 13	4 7/8	- 3/8	-7.1
O	CYBERMATICS INC	1- 3	1	0	0.0
A	DATA DOCUMENTS	17- 54	37 1/8	- 3/8	-1.0
O	DUPLEX PRODUCTS INC	6- 17	14 3/4	+1 3/4	+13.4
N	ENNIS BUS. FORMS	5- 8	5 5/8	- 1/4	-4.2
O	GRAHAM MAGNETICS	6- 20	6 3/4	- 1/4	-3.5
O	GRAPHIC CONTROLS	7- 12	9 1/4	0	0.0
N	3M COMPANY	63- 91	62 1/2	-4 7/8	-7.2
O	MOORE CORP LTD	46- 65	46	-3 1/4	-6.5
N	NASHUA CORP	32- 58	34 7/8	-1 1/8	-3.1
O	REYNOLDS & REYNOLD	11- 51	10 1/2	-2 1/2	-19.2
O	STANDARD REGISTER	11- 20	13 1/4	+ 1/4	+1.9
O	TAB PRODUCTS CO	6- 23	5 3/4	0	0.0
N	UARCO	15- 23	20 1/4	-1	-4.7
A	WABASH MAGNETICS	5- 8	4 3/4	- 1/8	-2.5
N	WALLACE BUS FORMS	14- 26	19	- 7/8	-4.4

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Why CIG has seven-hundred 360 Memory installations:

1 RANGE

CIG has an add-on memory system for every model in the 360 and 370 line including 22, 25, 30, 40, 44, 50, 65, 67 and 75. As a matter of fact, there isn't a manufacturer around who has more 360 memory than we do. Which means if you have any reason to buy 360 memory, you have every reason to buy it from CIG.

2 PRICE

CIG gives you bigger memory for smaller bucks. Actually, we've gotten a reputation in the industry for coming up with the lowest possible price for the best possible quality. Which isn't a bad reputation to have.

3 PERFORMANCE

With 700 installations and over 10 million operating hours in the field in every kind of application, the performance of CIG 360 memory says more than any ad can say for it.

4 EXPERIENCE

CIG, with its Data Recall product, was the first company in the industry to offer 360 independent memory. We went on from there. Improving on our improvements. Today, CIG is the world's leading independent memory supplier with sales, service and systems engineering support available throughout the United States, Canada and Europe.

5 DELIVERY

CIG 360 memory is available for any computer. Anywhere in the U.S. In 30 days or less. No ifs, ands, or buts.

6 SERVICE

We don't sell you 360 memory and walk away from you. We service you like you've never been serviced before. For one thing, we back-stop all our sales reps with our own CIG-trained specialists in every state of the Union. So if you need them, they're right there where you want them.

CIG. MORE THAN JUST MEMORY.

We're big in 360/370 leasing, too. We can design and deliver a complete hardware/financial package that'll give you CPU, memory, peripherals, and save you a small fortune, to boot.

We're doing all these things for other people. We know we can do any one of them for you. All you have to do is ask.

CIG

CIG COMPUTER PRODUCTS, INC.

A Subsidiary of Computer Investors Group, Inc.

1351 Washington Blvd., Stamford Conn, 06902

Dear CIG,

☐ I'd like to check your prices. Have your rep call me at_____

☐ Send info on other CIG Memory for the 360/_____, 370/_____

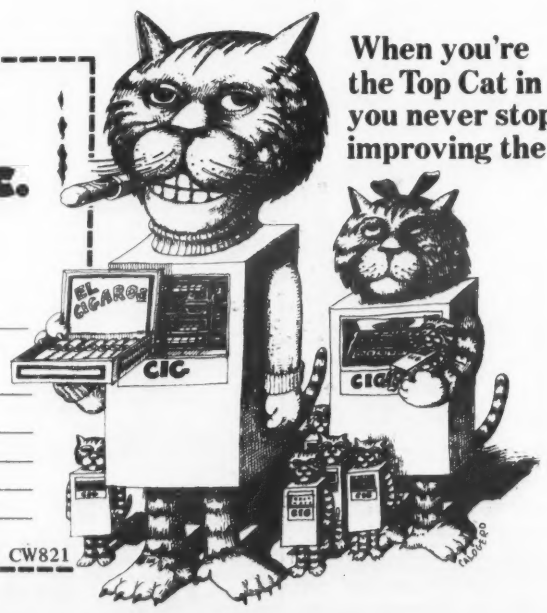
Name_____ Title_____

Company_____

Street_____

City_____ State_____ Zip_____

CW821



When you're the Top Cat in Add-On Memory, you never stop improving the breed.